INDIA RUBBER WORLD

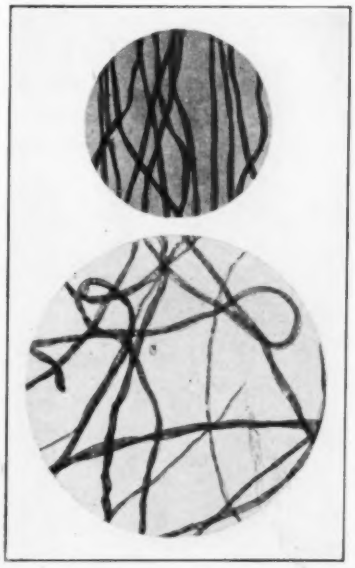
Published at 420 Lexington Avenue, Graybar Building, New York, N. Y.

Volume 77 | New York, March 1, 1928 | No. 6

Physical Bases *of* Tire Cord Properties—I

H. P. GURNEY AND E. H. DAVIS[1]

Briefly summarizing principal data derived from research bearing on cord properties, chiefly specifications, then discussing cotton fiber properties, cord and yarn construction, after which cord properties will be finally reviewed



Cotton Fiber Micrographs

VARIOUS criteria may exist for the physical evaluating of tire cord properties. Specification criteria or tests are for the purpose of quickly ascertaining the degree of equality or divergence of submitted samples from proposed standards, which are believed to be correct, or are the results of research and investigation. Service criteria are for the purpose of determining the real or intrinsic merit of cords for general or preferably specific applications. Comparatively few investigations have been published or perhaps conducted along these latter lines, though an abundance of research has been applied to the former lines.

The principal specification tests, apart from constructional, twist or fiber length analyses and weight, are breaking load, stretch or elongation at rupture and stretch or elongation under arbitrary loadings, sometimes erroneously called elasticity. Service tests would study the rate of deterioration or modification of cord properties when cords are subjected to alternating stresses between different limits or for different stress amplitudes and the concurrent influence of rubber processing, temperature, and externally impressed lateral pressures.

The standard specification tests usually record only those cord properties which are exhibited on the first outward stretch or half cycle, whereas in service the cycles to rupture may exceed ten million in number. The specification rupturing load may be 15 to 20 pounds per cord but the service rupturing load may be a load fluctuating somewhere between zero and 4 pounds. The specification stretch at rupture may be from 20 to 30 per cent, the service recoverable stretch certainly cannot exceed the 6 or 7 per cent fiber elongation at rupture and may be nearer 2 to 3 per cent. The specification temperature may be 70 degrees F., the service temperature 125 to 250 degrees F. To attempt to accurately correlate data from specification tests with data from service or imitation service tests would be nothing short of hopeless. The merit of specification tests lies in their speed of application and ability to determine equivalence or nonequivalence of submitted samples within reasonable spaces of time. The application of service criteria to routine testing, due to time requirements of the latter, would also be nothing short of hopeless. Still the two types of tests may tend to converge one toward the other. But true product design can only result from the application of quantitative data and measurements obtained from service or semi-service tests, to the quantitatively definable conditions of service.

Tire cord properties, whether from the specification or from the service point of view, result solely from cotton fiber properties in conjunction with cord structural constants, and, of course, processing, which in itself modifies cord structure

[1] Lawrence & Co., 24 Thomas St., New York, N. Y.

and perhaps cotton fiber properties. It will be the purpose of this paper to briefly summarize the principal data derived from research which bears on cord properties, chiefly however, the specification properties since most available research has been conducted along these lines. First cotton fiber properties will be briefly discussed, then cord and yarn construction after which cord properties can be more logically reviewed.

Volume for volume, the cotton fiber material is 50 per cent heavier than water. Cotton fiber lengths range from ½ to 2 inches. The cotton fiber cross sectional areas are roughly in inverse relation to length, so that cotton fiber volumes or weights do not differ greatly between different grades or varieties and from eighty to one hundred million fibers of any grade selected at random will weigh one pound.

The cotton fiber cross sections are flattened ovals, the widths being from three to one and one-half times the thickness. Under the microscope the fiber appears as a convoluted

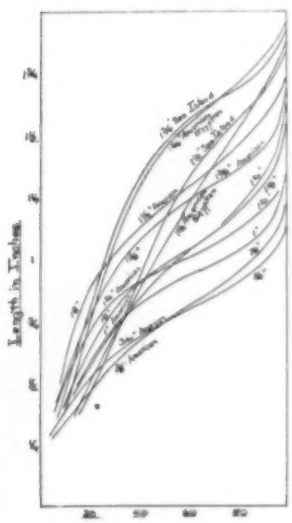


Fig. 1

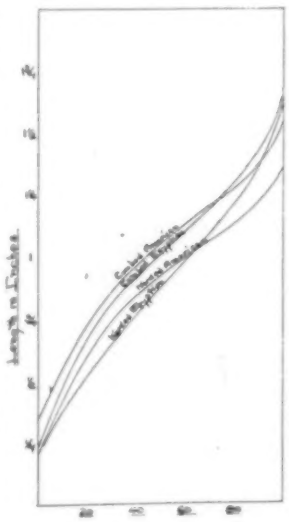


Fig. 2

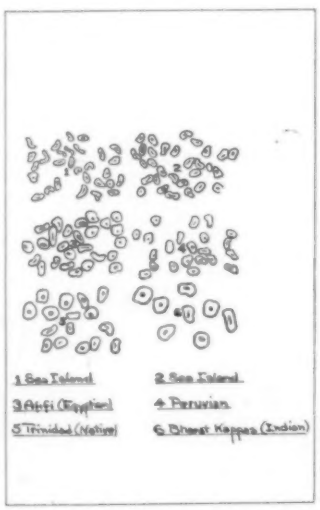


Fig. 3

Fig. 1 exhibits the distribution of cotton lengths in ¾ to 1½ inch American cottons of different stapling lengths, as well as 1½ and 1¾ inch Sea Island and American Egyptian. The curves show the relation between length in inches and the percentage of fibers up to any given length in inches. By far the majority of fibers are shorter than the stapling length. Fig. 2 shows the effect of combing upon an American and an Egyptian cotton, namely a general increase in length. From Fig. 1 it may be observed that the lengths of longer cottons are far more variable than the lengths of shorter cottons. Fig. 3 exhibits the relative shape and size of cotton fiber cross sections magnified 345 times, showing the variation in size from a fine Sea Island to a coarse Indian cotton.

or twisted ribbon. Above a certain point the number of convolutions to the inch of fiber length possess no practical significance as indicators of spinning value.

When the cotton fiber absorbs water from humid atmospheres, the volume of fiber increase is equal to the natural volume of the water absorbed in liquid form and the resultant expansion is cross sectional, there being little or no axial longitudinal expansion, although the fiber tends to become less kinky. At a normal regain of 8½ per cent, the increase in cross sectional area is 12 per cent. The quantitative effect of temperature upon volume expansion has not been studied.

Linearly impressed extension of the cotton fiber produces a cross sectional contraction of ¾ per cent for each one per cent elongation though this contraction is not immediately recoverable on release of tension. With steel the corresponding ratio is ⅓ per cent per one per cent elongation while with pure gum rubber it is ½ per cent per one per cent elongation.

When dry, cotton fibers are apt to be more kinky than when moist and partly because of this take up less space or "elbow room" when processed with high atmospheric humidity, a fact which has important commercial bearing as the yarns so processed are of smaller apparent diameter, stronger, less liable to break in processing, but of somewhat lower stretch under normal atmospheric conditions.

The time or duration of loading to rupture modifies the tensile of the cotton fibers to the extent of depressing the tensile 1/20 per cent for each 1 per cent increase of time to rupture. This same fundamental relation also holds true in the breaking of yarn, tire cord, square woven fabric, so that it may be concluded that if the tensile strength of the cotton fiber could be made to vary in tire cord, the breaking load of the cord would vary in the same proportion. This is confirmed by comparative tests in which single fibers and yarns spun therefrom are artificially weakened by different concentrations of sulphuric acid and in which tests the fiber breaking loads and the yarn breaks are found to be depressed from untreated materials to about the same extents. The tensile strength of the cotton fiber material is about the same as that of mild steel, from 70,000 to 90,000 pounds per square inch, according to conditions and method of testing.

The breaking load of the cotton fiber increases about 10 per cent from dry to wet condition, so this increase is inadequate to completely explain the 30 to 48 per cent increase in tire cord break, or the 40 to 50 per cent increase in yarn break from corresponding conditions of regain. The elongation at rupture of the cotton fiber from dry to wet ranges from 2½ to 7½ per cent, these percentages being lower than of yarn, in which some slippage may occur in tensing, and considerably lower than those of tire cord.

The cotton fiber stretched to its critical elongation ruptures no matter how this elongation happens to be approached. The exact effect of higher temperatures upon breaking load and corresponding elongation has not been studied but presumably the strength drops with increase in elongation up to a certain point. It should be noted that the continuously recoverable stretch of yarn or cord does not nor cannot exceed that of the cotton fiber.

The rigidity of the cotton fiber is best measured by the turning or twisting moment required to produce a unit twist per unit length of cotton fiber. The shorter fibers, which are cross sectionally coarser are more rigid not only toward twisting but toward bending. Longer and consequently finer cotton fibers are more pliable in all respects. The specific rigidity, or modulus of shear of short and long cottons is, however, the same, about 1/10th that of glass, and about 1/25th that of steel. The rigidity of bone dry cotton is about twice that of normal regain cotton and this, in turn, about three times as great as that of thoroughly wet fibers. This may possess considerable significance in considering

rubber frictioning processes. The rigidity of bone dry fibers decreases 1/7 per cent for each 1 degree F. rise, but decreases ⅓ per cent for each 1 degree F. rise for cotton of normal regain.

Under torsional or longitudinal stresses, cotton assumes the impressed set with greater facility the higher the temperature and the higher the regain. This rate of acceptance of set follows an exponential law in which the facility of acceptance of impressed set is proportional to the cube root of the time of stressing. These facts possess technical significance in the process stretching of rubber belts, or the molding stretch of tires by expansion of airbags during curing.

Of all external properties of cotton, the least studied and next to the fiber tensile the most important, are the coefficient of surface friction and the compactibility or volume condensibility of parallelized fibers. The coefficient of friction of cotton fibers when parallelized ranges from 0.3 to 0.4, being somewhat greater the longer the fiber. The coefficient of friction of fiber to fiber, or interfiber coefficient of friction depends upon the surface coefficient of friction of the cotton fiber and the surface contour complexity, the most common numerical measure of which is the convolutions per inch.

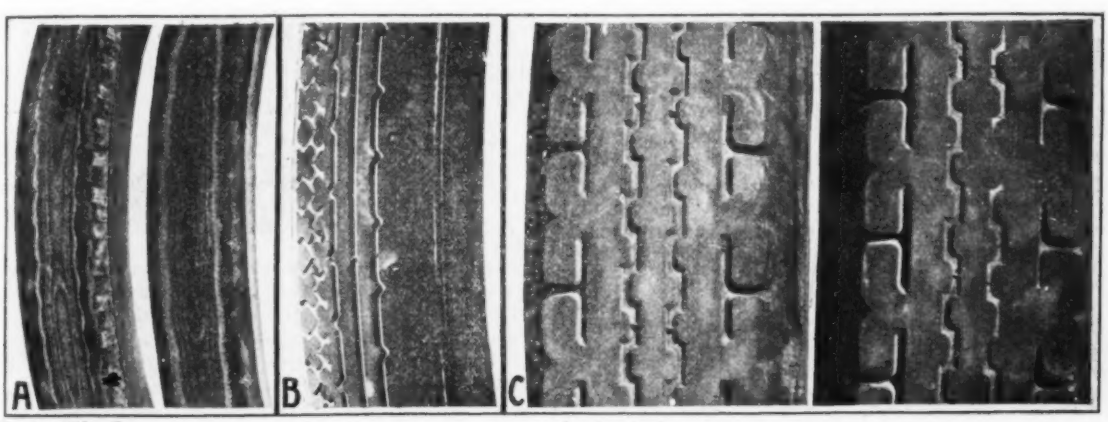
Both bone dry and wet cottons possess a slightly lower coefficient of surface friction than cotton at normal regain by about 5 per cent either way. With imperfectly parallelized cotton fibers the apparent coefficient of friction is somewhat higher than with reasonably well parallelized fibers. The effect of temperature upon this constant is not known. From wax extraction experiments it is often inferred that removal of wax increases the coefficient of friction of cotton surfaces. The surface coefficient of friction of cotton is of very distinct commercial significance. Whereas yarns and cords from which the cotton waxes have been extracted are stronger in tensile and less resistant toward repeated stresses, raw cottons so treated spin poorly. Interfiber coefficient of friction alone is inadequate to explain yarn and cord tensiles, nevertheless, it possesses a very definite bearing thereon.

The apparent specific volumes of cotton aggregates decrease with increased degree of parallelization, increased amount or extent of moisture regain present, and increased length of cottons, other things being equal. Combed yarns are denser than carded yarns. Parallelized cotton, if subjected to external pressure compresses ⅓ per cent for each 1 per cent increase in pressure. The apparent volume of highly compressed or twisted products such as tire cord does increase with high regain or wetting due partly to fiber cross sectional expansion, with consequent contraction in length, but this would not apply to parallelized cotton of more open structure. The subject of the compactibility of parallelized cotton is practically recognized by cotton men but not theoretically investigated.

(*To be continued*)

Abnormal Tire Wear

Premature Destruction of Casings Shown as Due Largely to Wheel Misalinement, Faulty Camber and Turning Radius — Devices for Correcting Troubles



Prather Mfg. Co.

(A) THE RESULT OF TOE-IN AND TURNING RADIUS WEAR. (B) AN EXAMPLE OF TOO MUCH CAMBER. (C) ONE TIRE WAS PROPERLY ALINED AND THE OTHER NOT

ALTHOUGH tire manufacturers are producing casings of the most durable materials and scientific design and construction as it is possible to employ to yield maximum efficiency, yet the life of the best tire may often be cut to but two-thirds of its normal span through causes wholly beyond the makers' control. Two tire users, for instance, may drive the same kind of new car, use new tires of the same good brand, and operate under similar road conditions for the same period; yet, while one will report entire satisfaction with his tires at the end of the test, the other will complain that, despite taking all the advised precautions, his tires had failed to give even fair service. Of course, the manufacturer is not spared in the criticism of the disappointed customer, who forthwith switches to another make of tire, only perhaps to have his unpleasant experience repeated.

The precautions taken were doubtless the good and familiar ones regarding curb scraping, misuse of brakes, overloading, imperfect inflation, running in ruts and car tracks, etc. But the disgruntled driver had probably failed to check up on his front wheel and axle alinement, and his tires had been subjected to undue diagonal grind caused by improper mounting or by ill-positioned wheels. Yet he had observed that during the driving his car was much inclined to dive, to

shimmy, and to steer hard, troubles traceable usually to misalinement.

Adjusters Save on Replacements

When a customer nowadays seeks a mileage adjustment on a tire which he claims has not given fair service a dealer will save a dispute and probably a loss in tire replacement by having the customer consent to a wheel or axle test on his car. In fact, many dealers now verify pitch, caster, and toe-in before putting on a tire in order to avert any disagreeable comebacks. For determining divergence from car builders' specifications various devices are used. One shop type automatically registers on a dial misalinement within 0.0125 of an inch. One contrivance small enough to fit into a vest pocket will indicate toe-in deviation down to 1/6 inch. In this and in a large shop model an essential feature is a depending plumb weight resting upon a hub cap to show deflection from perpendicular.

Another outfit automatically indicates through tread contact with the wheels the correct amount of toe-in regardless of worn bearings, wheel warpage, sprung axles, or looseness of spindle pins and bushings. Instruments used with it also test camber and caster. The aliner consists of two motor-driven drums set 56 inches apart, suspended from a frame, the whole placed in a pit with the tops of the drums level with the floor. One drum is mounted on immovable bearings and the other is pivoted and slidable and attached to an indicator which, when the front wheels of the car are being revolved on the drums, registers minutely each wheel's deviation from standard position. No camber (angle setting of wheel) or toe-in is required for rear wheels.

Tests Show Devices' Utility

The advantage in longer tire life obtained through precise correction of running gear faults was aptly illustrated in the case of a Pacific bus company in a test run from the Mexican border to the Canadian line. One front wheel was properly alined and the other left misalined. The first wheel's tire was found in good condition; the other had been very irregularly worn. Close checking proved that about 99 per cent of the excessive tire wear was due not to any inherent fault of the casing but to misalinement, leaving camber, casting, or turning radius to account for the damage otherwise not chargeable to ordinary wear.

Another stage company found that before using alining apparatus it had not been able to get more than from 2,500 to 3,000 miles from a front set of tires, but after installing such an outfit it easily got even three times the former mileage, and drivers all reported much easier steering.

How Misalinement Damages Tires

The usual effect of improper alinement on a tire is to cause the outside edge to scuff more than the inner side. It is pointed out that the outside of a 30-inch tire may in each revolution slip as much as ¾-inch to keep up with the inside, which, in excessive toe-in, having larger diameter and more leverage, grips the road firmly, leaving the outer side to slip and suffer undue abrasion. The reason for such wear being in scallops is that the rubber on the outer side first stretches to its elastic limits and then slips to equalize the differential strain. On excessively cambered wheels the abnormal wear may be smooth rather than patchy because of a steady sliding instead of an intermittent slipping action. From the feathered edge in the worn part being right or left can be determined whether the trouble was caused by toe-in or toe-out.

When a tread design has lines or void places straight across the outer edge the casing shows a step or saw-tooth wear, due to the end of the rubber in contact with the road being drawn endwise into the groove or void space. As the tread rises backward from the road the pattern resumes usual shape, but the worn parts having no hollow space to stretch into slide endwise and wear is rapid. When the tread is worn down until the groove is flat the high places will be soon ground down to the level of the low part. Then follows the scalloping wear from alternate stretching and slipping. The reason given for the progressive deepening, enlarging, and final merging of the scallop spots is that the tire having least weight at such places slips increasingly to relieve internal strain.

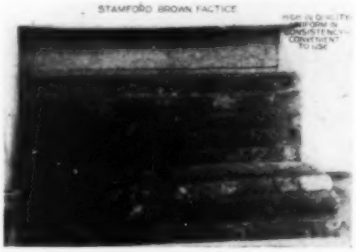
On roads where ice and snow are rare the pavement often has a quite flat crown, and in such cases a readjustment of a car's front axle and the wheels' toe-in from shop standard is frequently made to insure easier running and steering and to lessen liability of premature tire wear due to aforementioned causes.

Factice Packages Standardized

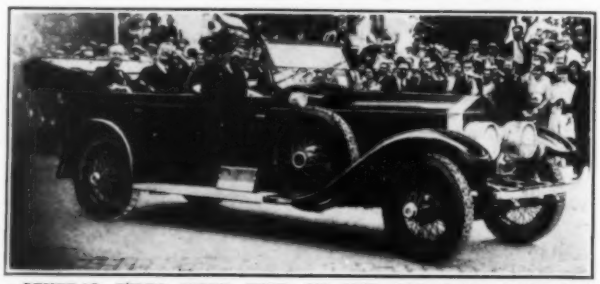
It is highly essential that every ingredient intended for compounding into rubber be packed in such manner as to preclude its contamination by extraneous matters.

Practically all manufacturers and suppliers of such materials fully appreciate this requirement but few have standardized the form and packaging of their goods to better effect than the makers of factice.

This material enters the composition of proofed goods and light gage calendered stocks for special purposes where accidental intrusion of grit, chips, etc., must be excluded to avoid imperfect goods. This is especially true of proofed goods and sheets.



The illustrations represent how one American factice company has standardized its packages. Ground white factice is packed in heavy crepe paper containers enclosed in new wooden barrels. Brown factice is finished in slabs of uniform size cut to fit neatly into new boxes built of dressed clean ⅞-inch lumber. Not only do these packages effectively protect the goods from damage and in a form convenient for the user but when emptied they can be utilized for packing finished rubber goods, serving thus a secondary economical purpose greatly to the advantage of the rubber manufacturer.

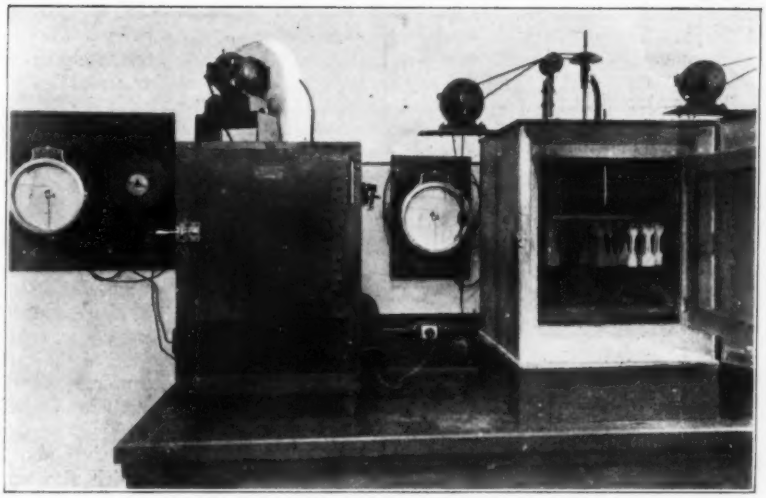


GENERAL TIRES WERE USED ON THE CAR THAT CONVEYED PRESIDENT COOLIDGE AND PRESIDENT MACHADO TO THE RECENT PAN-AMERICAN CONGRESS AT HAVANA.

Rubber Physical Testing

Mechanical testing methods reveal the great influence of apparently trivial variables on the physical properties of rubber

ERNEST R. BRIDGWATER[1]



Constant Temperature Testing Ovens

ONE of the first problems with which the early manufacturers of vulcanized rubber were confronted was that of devising means of determining the correct time and temperature of vulcanization for a rubber compound and appraising its suitability for the purpose for which it was intended. It was often impossible to postpone the commercial production of an article until a field test could be conducted on a sufficiently large scale to give a reliable indication of the serviceability of the compound. Rubber manufacturers soon learned to judge the quality and determine the correct cure for a stock by biting, stretching and tearing a sample of it. These tests furnished a crude method of determining tensile strength, modulus of elasticity, tear resistance, hysteresis loss, and permanent set of the compound in question. They are still used by all rubber compounders because they give some information which it is difficult to obtain by the mechanical methods now in vogue, but they have been supplemented to a large extent by machine tests which, in spite of their shortcomings, are in most cases capable of determining the physical properties of vulcanized rubber with greater accuracy than is possible by the older methods.

It is generally recognized that the great strides which the art of rubber compounding has taken, particularly during the last ten years, would have been impossible but for the aid of the testing machines used to determine the mechanical properties of rubber compounds. The widespread adoption of accelerated aging tests, particularly the oxygen bomb test, has contributed, perhaps more than any other development, to the improvement in the compounding art.

One of the greatest benefits which has resulted from the widespread adoption of mechanical testing methods is that they have pointed out more clearly than ever before what a great influence is exerted on the properties of a rubber compound by apparently trivial variables in the steps through which the rubber passes prior to vulcanization. Although it has long been known that the physical properties which a rubber compound will display are not definitely determined by the formula and conditions of vulcanization, it is only recently that rubber manufacturers realized what a profound improvement in the quality of a rubber compound can be effected by carefully controlling the conditions which surround the breaking down of the rubber and the dispersion of the pigments.

Rubber chemists have been handicapped in studying the effect of these variables and in investigating the characteristics of the many compounding ingredients which are available by the fact that there are other factors, such as the temperature at which physical tests are conducted, that often influence the results of the test to as great a degree as does the variable whose effect it is desired to study. In many laboratories it is the practice to always run a "blank" along with an experimental compound, but even this expensive practice is often the source of very deceptive misinformation. For example, even though the second batch is milled directly after the first one, the temperature of the mill may have changed materially. Identical compounds run under as nearly as possible identical conditions may give very divergent results unless all the variables which may affect the results of physical tests are carefully controlled.

The following descriptions of the procedures and apparatus used in the rubber research laboratories of the duPont company may be of assistance to others who are striving to achieve greater accuracy in physical testing.

Control of Crude Rubber

Prime ribbed smoked sheet rubber is used for all control tests on accelerators and anti-oxidants. The rubber used is all from estates owned and managed by Europeans which are chosen for the known uniformity of their product. The rate of cure of each lot is checked in an unaccelerated compound and any lot which is either above or below the standard is discarded. A 900 pound batch of rubber containing cases or parts of cases from nine different lots is blended and broken down in a Banbury mixer. Two of these blended and broken down batches are kept on hand in the laboratory at all times and are blended in equal quantities on our large laboratory mill before using. The supply is so arranged that when one batch is exhausted there is approximately half of the other batch on hand so that it is unnecessary to change entirely from one blended batch of rubber to the other. Pale crepe rubber is used for color standardization tests and the lower grades of plantation rubber, as well as fine para, are used in many commercial formulas. No attempt is made to control the uniformity of these grades of rubber as closely as the smoked sheet is controlled although it is customary to have all grades of rubber blended and broken down either on 84 inch mills or in a Banbury mixer so that our supply of each grade is always a composite of a number of different cases or bales.

Master Batches

Organic accelerators and other ingredients which are used in very small percentages are handled in 10 per cent master

[1] Chief Chemist, Rubber Research Laboratory, E. I. duPont de Nemours Co., Wilmington, Del.

batches in order to secure the greatest possible accuracy of weighing. Carbon black is used in the form of a master batch containing 40 per cent of carbon black and 60 per cent of smoked sheets. The rubber used in this master batch is standardized and blended as herein described. The purpose of this procedure is to obtain uniformly good dispersion of the carbon black. There are, of course, some batches in which the proportion of carbon black to crude rubber is greater than this and in those batches no master batch is used.

Milling Standards

Batches of the same type are always mixed on the same mill. For example, accelerator control batches are mixed on a 6 by 13 inch mill. A definite milling specification is prescribed for these standardization batches and others which are always of the same size. The milling specification designates the time of breaking down the rubber, incorporating the pigments and the total time for the batch. For other laboratory batches which are not recurrently mixed, we have not found it possible to set up standard specifications covering every detail of the mixing operation but we do specify the time for breaking down the rubber which is one-half minute per 100 grams of rubber or reclaimed rubber. When a batch contains both crude and reclaimed rubber the crude is put onto one side of the mill and the reclaim on the other at the same time and they are not worked together until both are running smoothly.

Uniform mixing procedures are of little or no value unless the temperature of the mill is controlled with equal accuracy. This is impossible without a constant supply of mill water at uniform temperature and under definite pressure. Cold water is neither necessary nor desirable for a laboratory mill because the batches are small and but little heat is developed. The water that is circulated through the mills is heated in a constant temperature tank to 47 degrees C. by blowing in steam, and is maintained at that temperature by an automatic temperature controller. The water is pumped from the constant temperature tank to the mills by a high speed centrifugal pump which delivers the cooling water under a uniform head. The temperature of the mill rolls is measured by direct reading recording potentiometer.

Curing Methods

All stocks on which physical tests are to be made are aged a minimum of sixteen hours between mixing and curing. Batches are sheeted out at the time of mixing to a thickness between 15 and 20 per cent greater than the thickness of the mold. The slab for curing is cut to the same size as the mold and is then weighed and trimmed so that it is exactly 15 per cent heavier than the cured slab will be. The operator is given the calculated specific gravity of the stock and is provided with a table showing the correct weight of the slab for any specific gravity. The slab is never permitted to be more than ¼-inch smaller than the mold in either dimension. In this manner excessive flow, which would result in an irregular grain in the cured slab, is avoided. This procedure also insures uniformity of thickness of the cured slabs. It is generally recognized that it is desirable to preserve the grain of the calendered stock insofar as is possible, especially in heavily loaded compounds. If the grain is seriously altered during molding, irregular breaks are likely to result.

All of the platens on each press are equipped with bleeder valves at the lower level of the steam chamber which are kept constantly open. The usual instruments are employed for controlling the steam temperature but the regulators are set by reference to a thermometer which is in the mold itself rather than the recording thermometer or the mercury thermometers on the platens. The thermometer is inserted so that the bulb is exactly in the center of the mold. All compounds are quenched in water at room temperature immediately upon removal from the mold. This precaution is essential only for compounds containing ultra or semi-ultra accelerators but, for the sake of uniformity, all stocks are handled in the same manner. The presses are equipped with transite shields which prevent any drafts from striking the mold or the platens.

Physical Testing

All physical tests are conducted in a room which is maintained at a temperature of 82 degrees F. ± 2 degrees F. by a forced draft indirect heating system. The fresh air supply is drawn from a point near the ground on the north side of the building. The air here is a little cooler in the summertime than it is inside of the building, due to the moderating influence of the Delaware River, which is only a few yards away, and to the fact that the ground between the river and the laboratory building is planted with grass, which also tends to keep the temperature down. The air is conducted through a galvanized pipe which is in the basement directly beneath the constant temperature room and is there heated to 82 degrees F. by means of a steam coil having 126 square feet of heating surface. The volume of the room is approximately 2,200 cubic feet and the air is circulated at the rate of 500 cubic feet per minute by a No. 3 conoidal fan. The supply of steam to the heating coil is controlled by a vapor filled bulb which is mounted on the wall of the constant temperature room. A valve which is operated from the testing room above regulates the proportion of fresh air which is drawn from the outside and the portion which is recirculated. In the summertime we use all fresh air but in the winter it is necessary to recirculate a portion of the air.

A recording wet and dry bulb thermometer indicates the temperature and humidity of the room. A constant humidity cabinet is now under construction in which samples will be stored between the time of curing and the time of testing, in accordance with the recommendation of the Physical Testing Committee of the Rubber Division of the American Chemical Society. It is planned to build a similar cabinet to be installed in the curing room for controlling the humidity of stocks between mixing and curing. The abrasion testing machines, as well as tensile machines, are located in this constant temperature room.

Aging Tests

Aging tests are conducted in air ovens at 70 degrees, and at 90 degrees C. as well as in the oxygen bomb at 70 degrees C. under 300 pounds pressure per square inch. The most accurate aging results are obtained in an oven in which the air is circulated by means of a blower that draws the air out of the oven at the bottom and forces it in at the top.

Upon entering the oven the air is distributed by an eight armed sheet copper device which is not unlike an ordinary gas burner in design. The arms are perforated at the top and the air passing through these perforations is deflected by the top of the oven and the air current is further broken up by a 200 mesh copper screen which extends over the entire cross section of the oven just below the air distributer. This provides a uniform rate of circulation of the air through all parts of the oven. The temperature of the oven is controlled by a vapor filled capillary tube 15 feet in length which is looped around the upper part of the oven just below the copper screen. A very sensitive control is obtained in this manner. With this type of control it is possible to keep the temperature of the oven within 0.5 degrees C. of the desired temperature.

Oxygen bomb aging tests are conducted in three bombs of one gallon capacity each. The bombs are heated in a water

bath whose temperature is maintained by means of a steam coil and the supply of steam is regulated by a temperature controller of the usual type. These bombs have flanged and bolted heads as the screwed-on head is unsatisfactory even for small bombs and it would be quite out of the question for bombs as large as these. The arms on which the samples are hung are notched so that the individual test pieces are always equally spaced. It has been our experience that the water bath is a much better means of controlling the temperature of oxygen bombs than an air oven. The oxygen bombs are housed in a separate chamber outside of the laboratory building. It is equipped with steel doors and a heavy steel plate somewhat larger than the door is erected a short distance in front of them. The purpose of this plate is to arrest the flight of any bomb or part of a bomb which may be thrown out of the room by an explosion.

The writer will be pleased to furnish blueprints and specifications for any of the devices or apparatus used in our laboratory, such as oxygen bombs, air conditioning apparatus, mill-water temperature control equipment, aging ovens and temperature control apparatus used thereon. The detailed procedure for conducting special tests, such as the plastometer scorching tests, will also be gladly furnished upon request.

Powdered Rubber Latex

Pulverized Milk Success Spurs Inventors — Concentrates Bridge Gap Between Common Sheet and Rubber Flour

EIGHTY MILLION pounds of powdered skim milk are sold yearly to American bakers, confectioners, and ice cream makers. About ten pounds of the fluid make one of powder. It is quite dry, too; for while whole milk averages 3½ per cent fat, 9 solids (proteins, carbohydrates, and mineral salts), and 87½ water, the skim milk powder which represents only the solids has scarcely 2½ per cent of moisture, as compared with condensed milk averaging 26½ of water.

The powder users can be assured of unvarying quality, the transportation cost is low, fuss and expense of handling and storing bulk milk are spared, not to mention avoidance of souring and spilling loss. The powder can be mixed dry, or dissolved in water, in bread making, and it will "mill" perfectly with usual compounding ingredients and give an "optimum cure," like an ideal rubber batch.

The milk powdering process is simple. After cream removal and pasteurizing, the milk is forced under 2,500 lbs. pressure through a tiny nozzle, emerging as a fine spray into a conical chamber through which heated air swiftly circulates. Moisture is carried off and the milk solids forming a powder are drawn by suction into airtight barrels. The powder may be reversed to skim milk by simply adding water.

Some experimenters even claim success in incorporating cream in the powdering of milk and keeping that unstable organic compound indefinitely by putting the evaporated solids in sealed containers in which air is replaced with an inert gas, as nitrogen or carbon dioxide.

Efforts to Pulverize Latex

Such progress has a peculiar bearing on a question that has long perplexed many rubber men. Why, it is asked, if milk solids can be thus converted into powder and valuable economies effected, can not rubber latex also be similarly dehydrated and conveyed and utilized in pulverized form? The advantages to be gained would, they are sure, more than offset the cost of production. Just as many inventors are trying hard to make a synthetic milk powder, others are wrestling with the problem of not only making a synthetic rubber latex, but also of converting the solids of natural latex into flour, flake, or granule form.

Ernest Hopkinson is one of many research workers who had hoped to reach some such goal. He says that after trying many methods of desiccating latex, he finally centered upon the spray-drying process which bears his name as the only practical one whereby latex could be most quickly and feasibly dried and bulked for manufacture. This process is a commercial success.

M. Kerbosch had sought to produce rubber in a dry or flake form, but his final evaporated latex product brought out in 1914 was at best a plastic with all the serum and with 5 to 10 per cent of moisture, even after milling. Others have since produced better specimens of dehydrated latex, but their efforts to actually pulverize the solid contents have been practically futile.

The Hitch in Powdering

O. De Vries says: "The tendency of the rubber particles to cohere is so large that rubber in powdered form is unknown, and that in the case where one obtains a flocculate the particles immediately cohere even on light mechanical treatment or on drying. Even spraying the latex in the new processes does not deliver the rubber in powder form, but practically at once leads to large flakes and a coherent though loose and spongy mass."

This handicap which makes the powdering of latex difficult or impossible may be accounted for in the nature of the latex particle, a complex hydrocarbon liquid of low viscosity encased in a shell of other hydrocarbons of higher viscosity, still further encysted with a non-rubber film, and the whole having a property of clinging to like particles unduplicated in any other substance. In fact, in no substance are found particles so loath to part from or so eager to rejoin one another, as in rubber.

A. Van Rossem, admitted an authority on latex, holds that the ideal way of using latex would be to transport it as dry rubber, and to convert it again into latex, thus making it necessary, he contends, to produce a rubber reversible into latex. He says that the fact that "latex contains 65 per cent of useless watery serum" but emphasizes the need of concentration to lessen shipping cost.

While not observing actual success in pulverizing or in wholly dry flaking, Van Rossem notes that with the aid of heat and rapid stirring a 60 per cent volume reduction has been obtained; and by evaporation in the presence of a protective colloid, with or without a coagulant, a pasty or solid reversible substance has been produced with but 25 per cent of fluid. Latex may also be creamed mechanically in a milk centrifuge and chemically with an Irish moss solution; and it has been concentrated with porous diaphragm filtration. The newest and most extensively applied latex concentration of its kind is that known as the Revertex, affording a notably efficient reversible latex, and which was described in detail in the INDIA RUBBER WORLD, March 1, 1927.

Direct Uses of Waste Rubber

The following patents have been collected from many widely scattered arts. Reading the abstracts will give a vivid picture of the many possible uses of waste rubber and how it can be utilized in making various products. The patents are arranged in chronological order.

JOSEPH ROSSMAN

UNITED STATES PATENTS.—1. Moulton, 94,631, Sept. 7, 1869. Printer's Inking Roller from Rubber Sponge. Ground rubber is molded into a roller and coated with a layer of rubber and sulphur which is vulcanized.

2. Tuttle, 122,926, Jan. 23, 1872. Croquet Balls from Rubber. Ground or pulverized rubber thread waste mixed with a small amount of sulphur used in molding croquet balls.

3. Dunbar, 170,941, Dec. 14, 1875. Rubber Articles. Floor covering having a base of cheap rubber material with a series of parallel strips in colors made of a finer quality of rubber.

4. Williams, 174,883, Mar. 14, 1876. Mats. A mat consisting of a base made from ground scrap rubber to which is vulcanized numerous pieces of textile fabric to form a design.

5. Cheever, 254,462, Mar. 7, 1882. Water Proof and Plastic Composition. Old waste rubber made plastic with vaseline is mixed with jute and powdered bark and applied on burlap to make a floor covering.

6. McGowan, 292,020, Jan. 15, 1884. Utilizing Discarded Rubber Belting. Ripping the strips of rubber belting, folding out the strips, applying to the same a layer of rubber, subjecting the whole to pressure and vulcanizing. Any desired article may be made from these sheets.

7. McGowan, 292,021, Jan. 15, 1884. Utilizing Discarded Rubber Hose. Sections of the hose are severed, and then folded out, subjected to pressure and vulcanized so as to remain in flat condition. They can be used as mats for steps.

8. Hyatt, 992,425, May 16, 1911. Reclamation of Waste Rubber. Ground scrap is compressed in a vacuum at 300 degrees F. to 430 degrees F.

9. Beasely, 1,049,039, Dec. 31, 1912. Rubber Composition. Scraps of old rubber are ground and then cemented together under pressure in a mold to produce any desired article. The product may be cured.

10. Dailey, 1,056,010, Mar. 18, 1913. Plastic Packing. Discarded rubber hose is cut up into small particles mixed with graphite flakes and lubricating oil. The mass is then packed into tubes of tin foil to be used as steam packing.

11. Thomas, 1,138,911, May 11, 1915. Tire Protector. The tread and beads of a worn tire casing are removed to form a protector for the inner tube.

12. Weber, 1,172,919, Feb. 22, 1916. Manufacture of Rubber Heels. Solid rubber tires are cut into slices approximating the thickness of the heels to be produced. The faces are ground to produce uniform thickness and heels are then cut out. Washers are forced flatwise into the interior of the blanks and nail holes leading to the washers are formed.

13. Flaherty, 1,182,669, May 9, 1916. Conservation in the Wear of Rubber Vehicle Wheel Tires. Rubber buffings are mixed with Para cement and applied to the roughened tread of a tire to form a layer of substantial thickness.

14. Beldam, 1,190,087, July 4, 1916. Engine or Machine Packing and Method of Manufacture. The layers of old tire casings are pulled apart, coated with an adhesive and then rolled or laid up into layers upon one another into the form of the packing required.

15. Kempel, 1,215,382, Feb. 13, 1917. Art of Making Mottled Rubber Flooring. Vari-colored particles of rubber are placed on a sheet of cheap grade stock, pressed together and vulcanized.

16. Philip, 1,230,510 June 19, 1917. Manufacturing Rubber Heels or Soles. This consists of dividing a tire into segment shaped pieces; holding the tire pieces in a flat condition; removing irregular portions of the tire pieces; dividing the tire pieces into slabs; punching the slabs to provide heel blanks; and successively branding and aperturing the heel blanks.

17. Montgomery, 1,249,292, Dec. 4, 1917. Tread and Process of Manufacture. The

The problem of utilizing waste rubber is of interest due to the large increase in manufactured rubber products and the consequent increase in waste rubber. Charles Goodyear, inventor of vulcanized rubber, realized that waste rubber could be utilized in making new products. In 1853 he obtained British Patent No. 2933 for mixing waste ground vulcanized rubber with raw rubber to produce a stock for manufacturing any desired article.

The present article deals with the direct uses of waste rubber. Old inner tubes and tires have been used in many ingenious ways to supply raw materials for washers, weather strips, buffers on boats and landing docks, etc. Balls, flooring, packing, heels, soles, leggings, stair treads, tire protectors, valves, radio panels, gears, pulleys, wall coverings, roofing are only a few of the numerous articles suggested in the patent literature which can be made directly from waste rubber.

beads and tread of a worn tire casing are removed; the material cut into desired shape and sewed transversely on opposite sides; the fabric is then folded and cemented together to form a tread for shoe soles, mats, stair treads.

18. Redfern, 1,255,107, Jan. 29, 1918. Shoe Sole. A number of layers of material from worn out tires are disposed with the fibers in one layer at an angle to the fibers in another layer. A layer of canvas is inserted between the upper layer and the next layer.

19. Gleason, 1,257,698, Feb. 26, 1918. Rubber Compound and Method of Producing It. Cotton and ground rubber scrap are rolled together until uniformly mixed. Unvulcanized rubber is added and any desired article is made therefrom such as shoe heels, soles and tires.

20. Barva, 1,265,419, May 7, 1918. Manufacturing Rubber Balls. Ground up old tires are mixed with rubber cement, compressed into a mold, heated and vulcanized into a ball.

21. Harley, 1,285,992, Nov. 26, 1918. Treating Old Tires to Produce New Material. Old tires are stripped, calendered between heavy rollers and vulcanized flat. The sheets may be used for packing by cementing them together with raw Para cement. The waste pieces remaining are ground up and rebuilt by pressure into a kind of stock that may be spread over the fabric body previously obtained.

22. Dettling, 1,309,118, July 8, 1919. Method of Producing Leggings. A tire carcass is stripped, cut into segmental blanks which are recurved on a line transversely to the major curvature of the segment. A rubber facing is vulcanized to the outer side of each recurved blank.

23. Druse, 1,319,575, Oct. 21, 1919. Method of Making Tires. Two injured tires are vulcanized together by means of a layer of rubber.

24. Muschewske, 1,381,654, June 14, 1921. Process of Reclaiming Rubber. A mixture of ground old inner tubes and tread stock in varying proportions is molded under heat and pressure to produce rubber stock.

25. Whitehouse, 1,426,800, Aug. 22, 1922. Wear Resisting Surfaces such as Tires, Stair Treads, etc. Alternate strips of rubber of different degrees of resiliency or hardness are adhered together side by side and vulcanized. Two or more sheets may be united, the strips of each layer crossing at an angle the strips of the adjacent layer.

26. Plauson, 1,432,895, Oct. 24, 1922. Reclaiming Rubber. Artificial latex made from old rubber by grinding in colloid mill with swelling agent, peptizing colloid, alkaline substance, non solvent dispersion liquid.

27. Stevens, 1,436,612, Nov. 21, 1922. Tire Bead Building Machine. This patent mentions that strips of rubber, or waste material are used in the manufacture of beads.

28. Bowser, 1,471,376, Oct. 23, 1923. Process of Constructing Mats. Tire casings are cut to desired lengths and breadths. The strips are placed along side of each other so that the adjacent longitudinal edges overlap each other, and are cemented to each other. The mat may also be formed by interweaving the strips.

29. Stedman, 1,482,952, Feb. 5, 1924. Reenforced Rubber Flooring and Process of Manufacture. The method of making a variegated rubber flooring, or the like, which comprises forming a plurality of batches of unvulcanized rubber compound, in each of which cotton of like fiber is a component part and each of which has its own distinctive color; treating said batches separately in a manner to mechanically comminute the contained fiber and at the same time cause an intimate and uniform mixture of the fiber and the rubber; then mixing together the plurality of color batches thus prepared by rolling the batches into a sheet, the association of the fiber and rubber being so intimate and the fiber being so finely comminuted as to serve to resist interflow of the separate colors sufficiently to permit repeated rolling operations without losing color identities and thus obtain a desirable striated design; and then vulcanizing the sheet. Uncured friction scrap such as waste from tire manufacture may be used in this process.

30. Wing, 1,493,511, May 13, 1924. Making Articles of Hard Rubber Dust. A side of a mold is faced with a sheet of vulcanized hard rubber. The mold is then filled with hard rubber dust and both are vulcanized together.

31. Desautels, 1,494,157, May 13, 1924. Airbag Treatment. A rubber vulcanizing bag is renovated by fusing its surface by a flame and removing the fused portion.

32. Mart, 1,505,272, Aug. 19, 1924. Reenforced Rubber Composition Strip. A composition flooring strip made of rubber scrap and reenforced with an expanded metal strip.

33. Stocks, 1,508,901, Sept. 16, 1924. Method of Treating Vulcanized Rubber Scrap. Rubber is masticated by very hot rolls and mixed with Para rubber to make boot soles, heels, linoleums, etc.

34. Meca, 1,517,221, Nov. 25, 1924. Reclaiming Rubber Materials. Devulcanized fiber scrap is used as a filler in raw rubber in making matting, soles, heels or tires.

35. Ellis, 1,544,534, June 30, 1925. Chlorinated Rubber Product. A rigid cellular mass is made by chlorinating scrap rubber loosely packed in small pieces.

36. Klug, 1,550,968, Aug. 25, 1925. Rubber Composition. Ground rubber scrap is mixed with uncured devulcanized friction scrap to make any suitable article such as mats or jars.

37. Stedman, 1,577,499, Mar. 23, 1926. Wall Covering. Uncured cord and fabric tire friction scrap is worked into a flattened mass by gross tearing in a cracker without shredding the fibers and then calendering and recalendering into a thin sheet. A backing of woven material may be applied.

38. Goodwin, 1,579,925, Apr. 6, 1926. Fibrous Material. Fluffed cotton and comminuted waste rubber are subjected to heat and pressure to form an absorbent sheet which can be used for insoles.

39. Sheppard, 1,583,703, May 4, 1926. Coating Composition. Ground rubber is dissolved in hot rosin varnish and mixed with cellulose lacquer to give a coating composition.

40. Reichert, 1,585,111, May 18, 1926. Floor Covering and Method of Manufacture. Discarded casings are ground; placed in a mold and compressed in the presence of heat on one side only, whereby a dense tread portion will result.

41. Loomis, 1,587,537, June 8, 1926. Molded Rubber Product. Powdered waste rubber is mixed with sulphur and heated in a mold under pressure in the presence of oxygen. Battery boxes, valves, radio panels, loud speakers, gears, pulleys, etc., may be made therefrom.

42. Hinson, 1,593,453, July 20, 1926. Play Ring. An annular tube of fabric filled with ground automobile tires.

43. Kinsley, 1,596,739, Aug. 17, 1926. Apparatus for Molding Rubber Heels. Finely ground waste rubber scrap is compressed in a die to form a heel.

44. Nye, Reissue 16,418, Sept. 7, 1926. Ball and Process for Manufacture. A baseball having a core made from a pulp like mass from trimmings of tire stock and a cover made from pieces of tire material.

45. Allyn, 1,614,024, Jan. 11, 1927. Method of Treating Automobile Tires and Products Resulting Therefrom. A discarded tire is heated and the tread is removed. The plies of fabric are subjected to heat and pressure to flatten it from which any desired shaped blanks are cut, such as soles.

46. Wescott, 1,645,635, Oct. 18, 1927. Paving. Powdered tire stock is impregnated with rubber latex, compressed and dried. The dried blank is then placed in a mold and vulcanized. It may be wire reenforced.

47. Schorger, 1,649,983, Nov. 22, 1927. Veneer Core. A veneer board is made from a core of hard vulcanized rubber made from ground old tire casings. The core is faced with a layer of wood.

48. Schorger, 1,649,984, Nov. 22, 1927. Roofing Felt. Old tire casings are shredded to liberate the fibers. The shredded material is subjected to an air blast to imperfectly separate the cotton from the rubber. Roofing felt is made from the cotton which is saturated with asphalt.

Foreign Patents

49. Charles Goodyear (British), 2,933 of 1853. Ground rubber waste mixed with raw rubber to make a new article.

50. Markus (British), 9,284 of 1909. Utilizing Waste Rubber. Articles are stamped out from old rubber and reheated in a mold.

51. Nielen (British), 15,269 of 1915. Leather Substitute. Devulcanized strips of tires are cemented together to form thin sheets of any desired article such as tool bags, handles, trunks, etc.

52. Chandeysson (British), 157,792, June 12, 1922. Manufacture of Boots, Shoes, and other Articles. Heels, uppers, garters, satchels are made from the fabric removed from old tires. The tire is treated with petroleum and the layers then stripped and used as desired.

53. French Patent 500,687, Jan. 2, 1920. Substitute for Leather. Strips of fabric obtained from devulcanized bicycle tires are glued together into plates or any desired article.

54. French Patent 529,870, Sept. 17, 1921. Manufacture of Soles and Heels. The fabric layers of an old tire are used in making shoe soles and heels.

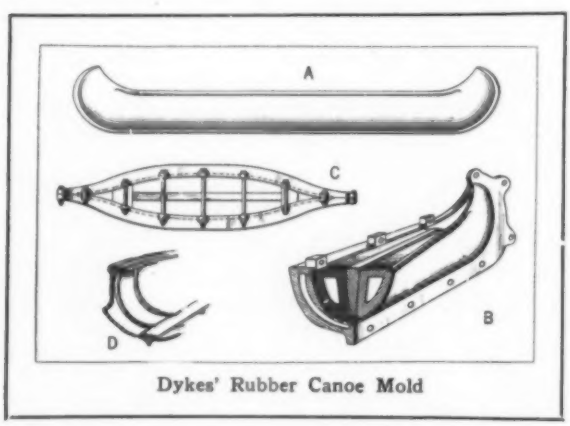
55. Danish Patent 20,962, Jan. 31, 1916. Leather Substitute and Method of Manufacture. Cloth strips left from devulcanizing tires with potassium cyanide are glued together and provided with a rubber wearing surface.

56. Danish Patent 23,992, Jan. 20, 1919. Process for Utilizing Linen Insert in Old Rubber. The article is flattened by pressing under steam pressure. The flat pieces are put together to form the desired thickness and finally pressed to a whole.

Molded Rubber Composition Boats

Flexible Rubber Boats in Any Size or Model Afford a New Outlet for Reclaimed Rubber and Scrap

ONE of the newer uses proposed for rubber, already applied in many thousand variety of ways and articles, is for the manufacture of canoes and small boats for oar or motor propulsion. Ordinarily such craft are constructed by covering a light wooden frame of the required shape with a covering of thin boards, ply wood or canvas. By this method craft of great elegance of workmanship are produced. A large proportion of their cost is occasioned by the relatively large amount of skilled work requisite in their making. However well built such boats may be they



Dykes' Rubber Canoe Mold

are subject in service to disintegration and decay by reason of unavoidable exposure to moisture.

By molding these small craft of rubber composition the expense of highly skilled labor is eliminated from the cost and deterioration is prevented. The patented system of construction and molding[1] is indicated in the diagram. In this system wood or metal framing is used and is embedded in a suitable rubber composition the vulcanized strength of which is sufficient to permit the use of much lighter pieces of framing.

Since the frame is wholly covered by the rubber it is permanently protected from the action of both air and water. The conventional frame structure may be supplied by molding it from the rubber composition itself making it one with the skin of the boat itself.

The accompanying illustration comprises three figures. *A* shows the side elevation of a molded canoe, *B* is a transverse section of one-half of the canoe mold, the canoe and internal molding pieces. *C* represents the closed mold in top plan. *D* shows a fragmentary section of the side and bottom of the canoe.

The mold consists of two lateral sections meeting along their centers and bottoms with a flange as shown in *C*. Through these flanges bolts are passed to fasten the mold halves together.

The interior faces of the molds are of the shape which it is desired to give to the exterior of the completed boat. In each half of the outer mold is a steam cavity. Fitting within the flanged outer mold halves are hollow metal cores for receiving steam and to shape the inside of the canoe. These cores are pressed downward and outward by a central lengthwise wedging piece. When closed the mold halves are bolted together not only along the keel but also crosswise of the top as represented in *C*.

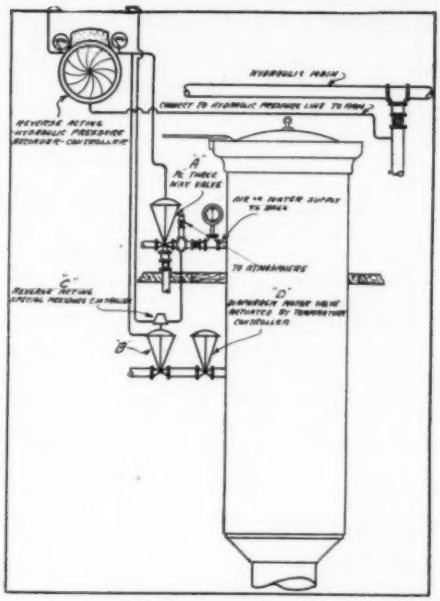
The boats vulcanized in such molds can be made of rubber composition in various qualities and colors with polished surfaces in exact reproduction of any model. While the molds are expensive, they afford facilities for rapid production of strong, durable and inexpensive craft. The method also permits the utilization of large proportions of reclaimed rubber and ground vulcanized scrap in the composition used. The rubber mixings can be of varying colors and physical qualities adapted to the various functions called for in the parts of the finished article.

One piece rubber composition boats of this sort are of less weight, stronger and more buoyant than corresponding size boats built of wood.

[1] U. S. Patent No. 1,655,496.

Pressure Recorder and Controller for Tire Presses

This device provides automatic admission and discharge of air or water bag pressure with rise and fall of hydraulic pressure—Automatic shut-off of steam with failure of air or water bag pressure—Automatic shut-off of steam with failure of hydraulic pressure—Hydraulic pressure record



COMPLETE automatic control on tire vulcanizers is possible only when temperature-condensation-time controls are supplemented by hydraulic pressure recorder-controllers. Substantial savings were effected through the installation in a tire plant of the first group of controls. These increased the uniformity of cure and saved steam while the hydraulic pressure controller wholly prevented lost heats. Both systems have been effective in reducing labor costs.

Operation of Presses

Twelve 48 and 60-inch presses with 18 and 22-inch hydraulic rams were used in the following test. These are arranged in two rows of five and seven units and each group is under control of one steam tender reporting to the press foreman. Each press holds from 22 molds for the smallest to 7 for the largest tires and about 105 different sizes are run on regular production schedules, from 30 by 3½ to 42 by 9.

Steel molds containing uncured tires with airbags inserted are delivered to the presses on a platform conveyer and loaded into the vulcanizers by a gang of 3 to 4 men. Air connections are then made to each bag and the press locked. A manually operated valve is then opened to release pressure to the hydraulic ram, putting the stack of molds under pressure. A pressure up to 1,200 pounds is available on the ram. The admission of air to the bags and of steam to the press is automatic from the time that the ram pressure reaches 750 pounds to the completion of the cure. In case of reduction either of hydraulic ram pressure or air pressure below set values the control automatically shuts off steam and releases air pressure on the bags.

Hydraulic Pressure Recorder-Controller

In the figure is shown a diaphragm-motor 3-way valve *A*, on the air line to the airbags, a duplex-top diaphragm-motor valve *B*, on the steam line and a reverse acting special pressure controller *C* mounted on top of *B*. These valves operate under the control of the hydraulic pressure recorder-controller which records hydraulic pressure on a 24-hour chart and controls valve operation as follows:

Air at 15 to 18 pounds pressure is supplied to the instrument from plant mains through a reducing valve to operate the diaphragm motors. When the hydraulic pressure reaches 750 pounds the controller releases pressure from the motor of valves *A* and *B*, thereby admitting air at controlled line pressure to the airbags and steam to the vulcanizer. Air can be supplied to the bags at controlled line pressures of 150 to 250 pounds, the majority of tire sizes requiring 180 to 190 pounds.

Vulcanizing then proceeds under control of the temperature-time-condensation control which holds a fixed temperature by varying the steam input through an additional diaphragm-motor valve *D* in series with valve *B*. This control holds a fixed temperature, shuts off steam at the end of the set curing period, and opens the blow-off.

The primary function of the hydraulic pressure recorder-controller is to insure against failure during the curing period either of air pressure on the bags or hydraulic pressure on the ram. Should the hydraulic pressure fall below the danger point of 750 pounds, the controller actuates valves *A* and *B*, the former shutting off air pressure to the bags and releasing bag pressure to the atmosphere, and the latter shutting off steam, thus stopping the heat before damage can occur.

During the cure some air leaks from the bags and the connecting piping, which is made up by the introduction of more air through valve *A*. Should the high pressure air line fall below the required bag pressure the reverse acting special pressure-controller *C* mounted on valve *B* comes into action, shutting off steam for as long as the low line pressure continues. Thus the heat is fully safeguarded against failure of pressure on either ram or bags and the 24-hour chart gives a complete record of hydraulic pressure. Together with the temperature-time-condensation controller, an automatic control is afforded for the entire process.

Former Method of Control

Previous to the adoption of the hydraulic controller the cure was started and maintained by manually operating air and steam valves after the hydraulic pressure had reached the desired point. After starting, the temperature was subject to the temperature-time-condensate control as at present.

With the temperature control alone the vulcanizers could be operated at a high rate, with close control of time and temperature, i.e., within one minute or one degree variation from the mean. But there still remained the human element of control over bag and ram pressures in starting the cure. When failure of either of these occurred the heat was ruined, either by blistering or bursting the tires in process.

Faults and Losses of Old Method

Before adopting automatic control of hydraulic and airbag pressures each row of vulcanizers required an inspector on each shift. His duties were to check the operations performed by the steam tender, as well as to inspect rings, bags and the product. He also watched the sequence of valve operation and in case of failure of hydraulic or airbag pressure stopped the cure. Even a most alert inspector would often fail to note a drop in pressure in time to avoid ruining a heat. Frequently a cure was ruined by failure to perform the required operations in the proper sequence. Such carelessness was costly and difficult to avoid even with the most stringent inspection. The spoiled cures had no effect on the quality of the finished output, since the tires were scrapped, but represented a heavy loss.

Previously, with only about one-third the present production, eight to ten heats were spoiled in the course of a year, due entirely to inability of the operators to stop the cure promptly in case of low pressures. This loss represented 175 tires valued at $3,255. Since the adoption of the hydraulic pressure recorder-controller, six months ago, there has not been one case of a cure ruined by failure of ram or bag pressure. Both air and water pressures have failed but in every case the control has saved the heat.

The operating costs and savings are shown in the accompanying table. Fixed charges are based upon 10-year life and 275 operating days. With chart cost, a liberal allowance for inspection, cleaning and replacement of parts, including diaphragms injured by oil in the air supply, the annual cost per unit is $85.73, or $0.31 per day. Air is an indeterminate but comparatively small additional item.

Savings

The former annual spoilage loss amounted to $3,255, with a credit of $245 for scrap value. Since no spoilage has occurred since the installation, the saving is $3,255 in this item alone. This is most conservative as the loss is the approximate average of years during which the output was only one-third as great as now.

Savings in inspection labor have been effected but these are due partly to the pressure controls, partly to the temperature-time-condensate controls and in some measure to more efficient management methods. Since the adoption of the complete control it has been possible to combine inspection with the duties of the steam tender.

A further saving could be effected if the layout of the presses was changed to permit one steam tender to handle both groups of presses. In spoilage losses alone the net annual saving is $2,232, a return of 82 per cent on the total investment in 12 hydraulic pressure recorder-controllers.

This article was abstracted from a Nielsen survey of the Tagliabue tire press vulcanizer controls used by the India Tire & Rubber Co., Akron, Ohio.

OPERATING COSTS AND SAVINGS EFFECTED BY HYDRAULIC PRESSURE RECORDER-CONTROLLERS

CONDITIONS

12 installed on 48" and 60" Vulcanizers.
Installed cost—$225 each.

ANNUAL COSTS (ONE UNIT)

Depreciation — $225 ÷ 10-year life	$22.50
*Average interest @ 6% — 11/10 × $225 × .06/2	7.43
Maintenance and repair — allowance to cover cleaning, inspection and parts	45.00
Charts — 300 @ $.036	10.80
Air — indeterminate and comparatively small.	.....
Total per unit per year	$85.73
Total for 12 units	1,023.00
Per unit per day — $85.73 ÷ 275 days	.31

SAVINGS

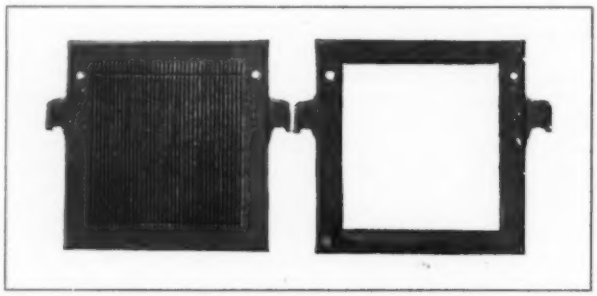
Former spoilage due to pressure failures.		
Value of 175 tires @ $20	$3,500.00	
Less scrap value @ $1.40	245.00	
Net loss (average per year)		$3,255.00
Less operating cost of controls		1,023.00
Net saving per year in spoilage		$2,232.00
Net annual return on investment of $2,700.00		82%

*Allowing for interest earned by depreciation reserve.

Rubber Filter Press Plates

New Engineering Application of Rubber in the Chemical Industry—Handling Corrosive Material

Filtration in industrial processes has involved, heretofore, the use of the more or less fragile and easily damaged wooden filter press plates and frames causing a disproportionate cost of upkeep in large plants. It has been found, however, that



Rubber Plates and Frames

such plates can be successfully displaced by those made of rubber. These rubber plates and frames have been designed as closely as possible in accordance with standard wooden plates and frames, in respect to width of joint surface, design of drainage surface, location of eyes and ports, etc.

The changes made in no way affect the general operating conditions or filtration efficiencies. In tests such test plates and frames were operated under pressures up to 65 pounds per square inch and showed very little distortion. The soft contacting areas between the plates and frames made a perfect seal, so that no leakage occurred. They were used in a standard filter press skeleton designed for wooden plates and frames. Rubber lined pipes through the press head, rubber lined plates against the press head and follower, and rubber lined valves to control the flow were used. In this way the material being filtered comes in contact with rubber only.

It is possible to arrange the ports in these plates and frames for washing or non-washing and open or closed delivery. The thickness of the frames may be varied if so desired.

The method of feeding a press under these conditions also presents some difficulties, but a satisfactory solution is offered through use of rubber lined blow cases in which the air is also used for agitation, diaphragm pumps with rubber lined liquid ends and rubber lined pipe and valves.

The advantages of using rubber in filter press work may be summarized briefly as including breakage of plates and frames, long life by resistance to corrosion, lightness and ease of handling, perfect sealing between plates and frames and low cost and upkeep.

Rubber Compounding Practice[1]

Black Pigments Used in Rubber Mixings—Carbon Black and Lamp Black—Relative Strengths of Pigments —Tinting Power Testing Methods

WEBSTER NORRIS

PIGMENTATION of rubber goods whether in black, white or colors is dictated largely by considerations of custom or style and has no necessary relation to quality. However, it is a fact that tire tread stocks of highest tensile properties and greatest abrasive wear are incidentally of most intense black. Black is not a color, but the absence of color. Black pigments when present absorb most of the light and their lack of luminosity is a measure of the black effect. White pigments, however, act in the reverse way, absorbing the least and reflecting the most light, producing the effect of whiteness of more or less brilliancy.

THIS series, of which the present article is the thirteenth, is based on practical experience, study of scientific rubber literature and research data, written for the INDIA RUBBER WORLD *by Webster Norris, well known rubber chemist and technologist.*

THE very informing articles previously published cover the following subjects: Origin and Reasons for Rubber Compounding; Laboratory Development of Compounds; Quality and Economy of Stocks; Plantation and Wild Rubber Supply; Scrap and Reclaim; Factice or Rubber Substitute; Mineral Rubber; Softeners; Carbon Black; Thermatomic Carbon and Clays; Zinc Oxide, Magnesium Carbonate and Glue.

Black Pigments

The only black pigment is free carbon in different forms. Those forms used for rubber work are chiefly: carbon or gas black, lamp black, bone black, hydrocarbon mixtures familiarly known as mineral rubber, coal tar, etc. The fact that any of these materials imparts blackness to rubber mixings is frequently of minor consequence compared with the influence they exert on the working characteristics of rubber mixings and vulcanized products.

As might be expected there is much difference between the black materials listed as regards their power to produce shades in white and colors. In this respect carbon black greatly surpasses any of the other materials. Its superiority is so marked that carbon black is gradually superseding lamp black as a pigment for black rubber footwear, a field in which lamp black for years held undisputed sway. In this line of goods intensity of blackness is essential for the best appearance of the product whether finished bright or dull.

From the earliest days of the rubber footwear industry lamp black was the accepted black pigment. It is only within recent years, however, that the more intense carbon black began to displace it in favor. At first this was due to economy. That is to say, carbon black affords the best black result for the cost of the pigment. Incidentally, it was found that boot and shoe uppers containing carbon black will withstand a greater number of flexings than uppers containing lamp black. Whereas lamp black was the leading black for rubber work in every division of the industry requiring black rubber, its place as a rubber pigment is now confined practically to boot and shoe making alone.

Rubber footwear manufacturers are well aware of the intensely black uppers of Russian rubber shoes and their baffling brilliant finish. This, it is reported, is due to the fact that lamp black is used greatly in excess of its employment in American rubber shoe practice. The excess serves in place of whiting as a filler. Thus an intensely black under body is obtained to receive the special high gloss transparent varnish imparting the brilliancy of finish. Russian shoe uppers also withstood cracking in wear better than American made shoes because their much larger percentage of black made the uppers more durable under flexing.

Early American practice in black pigmentation is indicated in the typical compounds of medium grade boot and shoe uppers. In these cases much of the blackness was contributed by the reclaim and coal tar content of the mixings. The lamp black serving to increase the general blackness and impart the basic blue black undertone developed by varnishing. A blue black water soluble dressing was applied after vulcanization to clean up the surface and give a temporary attractive appearance on unvarnished goods.

It is reliably reported that in current Russian and Swedish rubber footwear practice, carbon black in heavy percentages is displacing lamp black as indicated in the group of typical mixings.

Carbon Black in Tires

The use of carbon black in tires has progressed steadily since its original introduction for blackness. For this purpose only a small proportion on the rubber is required to give an excellent non-blooming black. The improvement in the wear resistance led to increasing the proportion of carbon black not for increase of blackness but to improve the resistance to abrasive wear. In the case of carbon black for tire purposes the blackness imparted to the rubber mixing is an incidental rather than the primary object. Fortunately

[1] Copyright, 1928, by Webster Norris. Continued from INDIA RUBBER WORLD, February 1, 1928, pp. 58-60.

both results are attained in superlative degree. The development of carbon black tire stocks is still continuing and it is not yet known how much above the present level of 50 pounds of black to 100 of rubber it may go.

Carbon Black in Footwear

The following rules for proportioning carbon black in footwear compounds represent safe practice as recommended by a leading American rubber technologist familiar with current practice and service conditions.

CARBON BLACK IN RUBBER FOOTWEAR

	Carbon Black Percentages on Crude Rubber	
Types of Footwear	Uppers	Heels and Soling
Light goods	6—12	12—18
Heavy goods	12—18	18—24
Acid-proof and mining boots	24+	30—40

In the table it will be noted that heels and soling for the heaviest duty goods approximate tire tread stocks in the matter of reinforcement. Often in the earlier American footwear practice heel compounds were of distinctly lower quality than the soling. In fact, no great difference in quality existed in the mixings for heels of any quality or weight of boots. This failure to properly balance the wearing quality is a fault easily corrected without undue expense.

Lamp Black

Lamp black, 190 specific gravity, is produced by burning high boiling point hydrocarbon oils in large pots and rapidly chilling the flame. This produces a soot which is very high in carbon. It is settled in chambers from which it is removed and packed. The more quickly and completely the flame is cooled the higher the grade of black obtained. If the black remains too long in the hot zone it is graphitized, a condition which makes it of lower grade and grayer.

Lamp black has the advantage over other blacks in fineness of texture and freedom from grit. Thus, it is capable of colloidal dispersion in hydrocarbons, such as rubber, if properly handled. It is the strongest black pigment next to carbon black, compared with which it rates about 25 per cent less in tinting power and blackness. For shading whites and colors lamp black is generally preferred to carbon black because its blue undertone produces a more desirable effect than the brown undertone of carbon black. The difference in color tone of these two varieties of black becomes evident when their intensity is reduced by rubbing up samples, with sufficiently large proportions of any strong white pigment, into a paste with linseed oil. The blue tone of lamp black gives it preference in the paint manufacturing industry for comparing the relative strengths or tinting power of white pigments.

Bone black, or drop black, is obtained by calcining bones out of contact with the air. It has only about 15 per cent of the strength of lamp black but is blacker than either lamp black or carbon black. It contains not over 20 per cent of carbon, the remainder being bone ash, consisting chiefly of phosphate of lime. It is used where great blackness is required, as in hard rubber, and in pyroxylin coated artificial leather. Owing to its deficiency in strength it is never used for tinting. Its specific gravity is about 2.85.

The method of testing lamp black is as follows: 50 milligrams of black are mixed and rubbed out with 5 grams of standard zinc oxide and 50 drops of raw linseed oil. This is compared with a like quantity of the different grades by smearing them side by side on a piece of thin glass, comparing the tone as seen through the glass. It will require 50 per cent more zinc to reduce the highest grade to a gray color to match the lowest grade.

To compare the intensity of the black, it is merely rubbed up with sufficient raw linseed oil to make a paste, and smeared on glass as described above, against a black of known intensity. This test merely shows the blackness or intensity and not the tinting power. These two qualities have no relation to each other as ivory black, for example, has great blackness but no tinting power.

Miscellaneous Blacks

In the manufacture of ordinary mechanical rubber goods where special stress is not laid on the intensity or tone of blackness satisfactory effects are always obtainable by the pigment value contained in black reclaim and bituminous products such as mineral rubber, coal tar, etc. Whole tire reclaim is particularly effective for incidental black pigmentation because of the high content of carbon black present in all American made automobile tires.

ICELAND FAVORS AMERICAN GOODS

About 65 per cent of the rubber boots and overshoes sold in Iceland are of American make; and practically all the automobile tires used in that Danish possession are from the United States, according to the United States Department of Commerce.

Typical Rubber Mixings Containing Black Pigments

DRY HEAT ORDINARY UPPER STOCKS UNACCELERATED

	Boots.	Shoes.
Hard fine Para	9.0	5.0
Coarse Para	25.0	15.0
Shoe reclaim	10.0	10.0
Sulphur	2.0	1.0
Litharge	10.0	8.0
Lamp black	**2.0**	**1.0**
Soft coal tar	12.0	24.0
Whiting	30.0	36.0
	100.0	100.0

Dry heat cure. Five hours at 275°F.

BLACK MOLDED INNER TUBE

Smoked sheets	40.00
Black inner tube reclaim	**50.00**
Zinc oxide	3.75
Sulphur	3.00
Stearic acid	1.00
Accelerator	0.25
Oil softener	2.00
	100.00

Cure 6 minutes at 307°F.

HARD VALVE

Smoked sheets	40.0
Fossil flour	7.5
Zinc oxide	5.0
Flumbago	10.0
Bone black	**12.0**
Hard rubber dust	10.0
Lime	2.0
Accelerator	0.5
Sulphur	13.0
	100.0

Cure 1 hour at 307°F.

PRESSURE CURE HEAVY SHOE STOCKS

	Upper.	Soling.
Smoked sheets	100.0	100.0
Shoe reclaim	15.0	20.0
M. R.	10.0	10.0
Carbon black	**24.0**	**40.0**
Zinc oxide	10.0	10.0
Sulphur	3.5	3.5
Pine tar	1.5	1.5
Degras	1.0	1.0
Stearic acid	1.0	1.0
Accelerator	1.0	1.0
Anti-oxidant	1.0	1.0
	168.0	189.0

Cure 90 minutes to reach 240°F., then hold 60 minutes at 240°F.

SMALL MOLDED GOODS

Smoked sheets	15.0
Tire reclaim	**50.0**
Litharge	5.0
Sulphur	2.5
Clay	27.0
Accelerator	0.5
	100.0

Cure 12 minutes at 307° F.

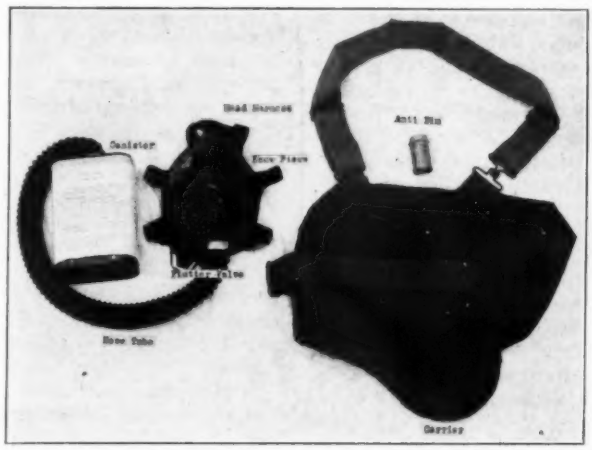
Rubber and the Army Gas Mask

Protection Against Toxic Gases of Industry and Warfare Requires that the Best Quality of Rubber Be Used in Gas Mask Construction

MAJ. GEN. AMOS A. FRIES

CHIEF OF CHEMICAL WARFARE SERVICE, WASHINGTON, D. C.

THE soldier fighting in clouds of chemical agents (gas) is confronted with the same hazards that coal miners, firemen and chemical plant operators have to face and like these men, the soldier wears a gas mask in order to eliminate from the air breathed all irritating and toxic gases, dusts or vapors. This protection against the toxic gases of industry and those of warfare requires that the very best quality of rubber be used in the construction of the gas mask. The toxic gases and dusts encountered in industry are of the same general nature as the chemical agents of warfare; in fact, some of the latter are industrial chemicals. However, the army gas mask is not suitable for general industrial use nor are industrial chemicals suitable for army use. The reason for this is that the army gas mask is designed for use in the open, for protection against relatively low concentrations of every conceivable chemical agent which may be effectively employed in warfare; whereas, each of the various types of industrial masks is designed for use in enclosed spaces where relatively high concentrations of a particular gas or group of gases may be encountered.



Latest Type U. S. Army Gas Mask and Carrier

The army gas mask is similar both in appearance and operation to industrial masks. It consists of a rubber facepiece connected by a corrugated rubber hose tube to a tin can known as the canister. The facepiece fits snugly to the face so as to be gas tight and is held in place by an elastic head harness. Incoming air enters the canister where it is purified and then passes through the hose tube to the facepiece, impinging at once on the eyepieces, so as to prevent fogging. A rubber flutter valve extending below the chin of the facepiece provides an exit for exhaled breath. The eyepieces are made of non-shattering glass and in one type of facepiece there is a diaphragm which permits conversation.

The canister which purifies the air is fitted with a filter whose function is to retain irritating or toxic smoke and dust, and is filled with chemicals which absorb or neutralize toxic gases or vapors.

The chemical filling of the army canister consists of activated charcoal and soda lime. The activated charcoal absorbs organic vapors such as mustard gas, lewisite, chlorpicrin, cyanogen chloride, alcohol, benzene and carbon bisulphide and to some extent, acid gases such as phosgene, chlorine hydrocyanic acid and sulphur dioxide. These acid gases are eliminated more effectively, however, by the soda lime with which they combine chemically.

There are a number of toxic gases such as carbon monoxide and ammonia for which neither the charcoal nor the soda lime of the army gas mask canister afford protection, although adequate protection against these gases could be provided if necessary. Silica gel as a canister filling, affords protection against ammonia; and hopcalite, a mixture of oxides of cobalt, copper, manganese and silver, affords protection against carbon monoxide.

Silica gel and hopcalite are not employed in the army gas mask for the reason that ammonia and carbon monoxide cannot be effectively employed in warfare. They dissipate so rapidly in the open that the soldier is not apt to encounter dangerous concentrations even if attempts were made to use these gases as chemical warfare agents. These substances are, however, very important components of the canister filling for certain industrial and navy submarine gas masks. Silica gel is the essential filling for gas mask canisters required by refrigeration plant operators who encounter dangerous concentrations of ammonia; and hopcalite is employed in gas mask canisters used in coal mines, in fighting fires, and also, in submarines where dangerous concentrations of carbon monoxide may be encountered.

Each of the various types of groups of toxic gases and vapors thus requires special chemicals for canister filling in order to provide protection. There is at the present time no toxic gas vapor or dust known for which a fair degree of protection cannot be provided. Canisters can be made up with certain fillings which will eliminate from the air breathed any one or all of these toxic gases or dusts. No canister, however, affords protection indefinitely. Its life is dependent not only on the total quantity of gas which it is capable of adsorbing or absorbing, but also upon the concentration of the gas which it is required to eliminate from the air breathed. For very high concentrations the life of the canister may be only for a few minutes while in very small concentrations it may be a matter of several hours before the canister becomes so saturated that gas breaks through to the facepiece. The time, concentration and nature of the gas for which the canister will afford protection should be known before one relies upon the gas mask in an atmosphere containing toxic gas or vapor. It should also be realized that the canister type of gas mask is of no use except in atmospheres containing a sufficient amount of oxygen to support life.

For protection in enclosures where there is not sufficient supply of oxygen in the air to support life, an entirely different type of gas mask is required. In places such as coal mines where there is at times an insufficient supply of oxygen, the oxygen inhalator or oxygen breathing apparatus is employed. This is a type of mask which is completely enclosed and provided with a cylinder of compressed oxygen which is slowly released about the face of the wearer. No air from the outside can enter this mask.

Another type of mask employed where insufficient oxygen is present, is the hose tube mask. This consists of a facepiece such as the army gas mask facepiece, to which is attached a long hose tube which extends to a source of pure air. This type of mask is useful for workers required to carry on in oil tanks or other enclosed places which either do not contain a sufficient supply of oxygen or else contain such high concentrations of vapors or gases that a canister would break down in an extremely short length of time.

All of the various types of gas masks have essentially the same rubber parts and these must retain their original physical characteristics if a gas mask is to serve its purpose. It is particularly important that the rubber parts of the army gas mask stand up in storage since in the event of war thousands of men may have to be equipped with masks over night. This necessitates that a surplus supply be built up in peace time in readiness for any emergency.

The rubber parts of the World War masks have, to a very large extent, long since deteriorated so that these masks are now useless. The same is true of many masks which have been made since the war but researches carried on by the rubber industry are continuously improving the quality of rubber so that its useful life is gradually being increased and is of less uncertain duration.

Nine of the forty items required in the assembly of the army gas mask are wholly or in part, made of rubber. These rubber components are: the facepiece, which is of flat molded rubber covered on one side with olive drab stockinet; the hose tube, which is a flexible corrugated rubber hose and is also covered on the outside with olive drab stockinet fabric; the deflector; the flutter valve or the exhalation valve; the check valve, through which incoming air enters the canister; adhesive tape; elastic tape; washers; and rubber cement.

The specifications under which the rubber components are purchased have been drawn up as a result of careful study of the Chemical Warfare Service and in many instances in cooperation with rubber manufacturers. These specifications are, however, constantly being changed and improved as a result of experience, and also to conform to the best compounding practice of the industry which is constantly improving the quality and aging properties of rubber.

Until recently it has been assumed that even under the best conditions of storage the maximum useful life of the rubber parts of the gas mask is about five years and at times the rubber facepieces and hose tubes have become unserviceable either in use or in storage at the end of a year or two. Experiences of this character have resulted in extensive investigations being undertaken to determine conditions of storage required for extending the life of rubber. An enormous amount of data has been collected but much of it is so conflicting that there is as yet no entirely satisfactory solution to this problem. It would appear, however, that this difficulty may be overcome by the use of rubber compounded with anti-oxidants since accelerated aging tests have shown that the use of anti-oxidants may increase the life of the rubber several fold, possibly as much as five times. The use of anti-oxidants is, however, so new to the art of rubber compounding and a knowledge of their effect on the aging properties of rubber so limited that their value is still somewhat problematical. For this reason researches are constantly being carried forward in an attempt to determine suitable substitutes for rubber as used in the gas mask. It is also desirable that suitable substitutes be discovered for the reason that rubber is not a native raw material and in the event of war, this country might find it exceedingly difficult to import a sufficient quantity to meet all the varied requirements.

Rubber and Textiles in the A. S. T. M.

In the 1927 review number of the *Bulletin of the American Society for Testing Materials* the work of the society as relates to rubber and textiles is summarized as follows:

While standardization work has continued to receive the attention of Committee D-11 on Rubber Products, the outstanding development in the work of this committee has been the giving of consideration to performance tests. Its standardization activities have resulted in the revision and the proposed revision of several specifications for rubber products such as rubber insulating tape. The committee's specifications for rubber-lined fire hose have also been reviewed by the Sectional Committee on Specifications for Rubber-Lined Fire Hose and substantial agreement has been reached on recommendations to be made to the American Engineering Standards Committee. The trend toward the study of performance tests, however, has been quite important, resulting in the organization of several new sub-committees on abrasion tests, on life tests, on flexing tests and on rubber products for absorbing vibration.

Committee D-13 on Textile Materials has developed its work of standardization so that it now has twelve standard and seven tentative specifications and tests. One important new standard brought out during the year is for the identification of fibers and their quantitative determination in mixed goods. Work under way should lead to a number of new tentative standards in 1928, while work recently initiated on raw cotton may be expected to lead to a tentative standard in 1929.

A new sub-committee on finishing materials used in the textile industries offers opportunity for standard test methods and standard specifications covering a quite wide range of different materials. The committee in addition to its usual work on standardization of tests, test methods and specifications, has undertaken in a small way some work that is to some extent research of a higher order than the statistical researches required in the ordinary run of standardization.

Research to determine a working relation of the strength and stretch of knitted fabrics by a test break made on the fabric by the pressure of a ball or plunger on a sample held in special clamping devices has been in process for more than a year. There are many variants to be taken into account in this investigation which may require more time than expected but a tentative report may be expected shortly. An investigation of the relation of strength and elongation of cotton fibers under tensile stress to their spinning qualities has been undertaken but has not passed beyond the preliminary stages, but an active program for 1928 has been outlined which should lead to more or less definite results.

RUBBER SAFEGUARDS DETECTIVES

Scotland Yard detectives investigating cases in which cadavers must be handled are provided with a bag containing among other things a rubber apron and a pair of rubber gloves as safeguards against septic poisoning.

SOUTH AFRICAN HOSE TARIFFS

Rock drill and delivery hose made in Canada has lately been made subject to ordinary and sales dumping import duties in another British dominion, the Union of South Africa.

New York Rubber Exchange

Second Annual Dinner

ABOUT two hundred members and guests of the Rubber Exchange of New York, Inc., attended the second annual dinner that was held at The Roosevelt, New York, N. Y., on the evening of February 15, 1928. Francis R. Henderson, president of the Rubber Exchange, officiated as toastmaster and introduced the speakers. The principal addresses were broadcast by WRNY.

Congressman Louis T. McFadden, of Pennsylvania and chairman of the committee on Banking and Currency of the House of Representatives, spoke of the various exchanges and particularly the Rubber Exchange as being a vital factor in the development of rubber commerce and industry.

Referring to brokers' loans, he called attention to the economic service these loans perform on the Stock Exchange in absorbing funds for which the banks have no outlet at the time being. Brokers' loans, he said, were a sound secondary reserve for the member banks of the system.

Other speakers were Charles H. Tuttle, United States Attorney for the New York Federal District, and Neal O'Hara, the well-known humorist. Mr. Henderson then spoke of the remarkable progress made by the Rubber Exchange during the past year as follows:

One year ago tonight I addressed you on the occasion of the first anniversary of the Rubber Exchange, and at that time I pointed out that the volume of business for the first year amounted to 62,704 contracts, or about 156,760 tons of rubber. By way of comparison, you will be interested to learn that in our second year transactions totaled 123,365 lots, or 308,412½ tons. This represents a value of about $260,000,000. These figures plainly show the importance of our institution, and the place it is finding for itself in the industrial welfare of the nation.

The crude rubber industry has been beset with many difficulties and the past year has been one of considerable uncertainty. The consumption of rubber was rather below expectations, but this was due to the unsettled condition of the automobile business in the latter part of the year. Production, even though restricted in the British area, was sufficient with the slight under consumption to leave us at the end of the year with a fair supply of rubber in the world. It is interesting to note that the prices for our second year ranged between the high of 43.50 on March 31, 1927, and the low of 31.70 on February 14, 1928.

I am convinced that the Exchange has been the largest contributing factor in confining the fluctuations to so narrow a range, and we have reason to be proud that the Exchange has proved itself quite capable of handling an increasing volume of business without in any way marring the smoothness of its operation.

The new year has, so far, indicated that we are approaching what may be termed a freer market for the world's rubber. I mean by this that there is every indication that we will soon return to a market dominated by economic laws rather than by government regulations. The British Premier, Mr. Baldwin, recently announced the appointment of a committee, composed of cabinet members, to investigate the operation of the present restriction law, and make recommendations as to its retention or abolition. In any event, we need not expect these recommendations for two or three months, and in the meantime our market has receded to a lower level, presumably in anticipation of a larger production for the ensuing year. Whatever may have been said as to the necessity for the restriction law when it was first promulgated five years ago, the effect of the regulations in the past year has been to stimulate production in other areas, and it is only natural that a large percentage of the British producers are now complaining that their dominant position in the producing world is being threatened by regulations originally intended to preserve that position.

To me the most interesting part of the whole question of rubber supply today is the indication that, even if the restriction law is maintained on the 60 per cent basis, there is no reason to fear a shortage of rubber for some time to come. Eventually, with the normal increase in consumption and the inevitable finding of new uses for rubber, the world must plant more trees. I thoroughly believe that America will find its economic independence with regard to rubber through its own planting. Whether this be in the Philippines, South America or the Far East, it matters little.

With business supplanting politics in the direction of world affairs, our fear of the future is not one of armed conflict, but rather of unhealthy prices for the raw materials for which we depend upon foreign monopolistic control, and rubber has been in this category for the past five years. I believe our British friends will ultimately appreciate Secretary Hoover's stand in regard to rubber, and as a result allow the value of the commodity to be determined by economic laws.

I am pleased to report to you tonight that most of the important rubber dealers in the London market have become members of the Rubber Exchange in the last year. There is a very marked increase in the business done on the Exchange for account of European interests, as well as shippers in the primary markets. Our manufacturers are also availing themselves to an increasing extent of the price insurance offered through exchange transactions. In other words, there is an ever increasing interest on the part of all of the elements which make for the buying and selling of rubber, and our Exchange can well be proud of its healthful development in the short space of two years.

You will remember that the Board of Governors appointed a committee on June 16, 1927, for the purpose of establishing new type samples. After many conferences with committees of the manufacturers' and dealers' associations the samples have been approved by the Rubber Trade Association of New York, the Rubber Association of America, and the Rubber Association of Canada. Types are being sent to foreign markets with the request that they join with us, and I think that this is a step forward of the utmost importance.

I cannot close without referring to the so-called pool operations, and in expressing my belief that they have performed a real service to the industry. We have all realized from the beginning of the Rubber Exchange that a stock of rubber in New York would lend itself to broader operations, making for stabilization in prices, and the amount of rubber which these companies have purchased will serve as an incentive to trading, and we hope will justify the wisdom of establishing a national reserve of crude rubber.

Rubber Anatomical Manikins

Students Can Be Taught Obstetrics, and Soon Other Branches of Medical Science, With Realistic Rubber Figures of Body and Sections—May Replace Cadavers

ACCURATELY designed, artistically molded and naturally tinted, rubber models of the human torso and its principal organs are now provided for medical schools that may not only serve with remarkable efficiency in anatomical and physiological instruction, but may even make it unnecessary to resort much more to morgues for clinical models.

A pioneer in this unique line of rubber craft is Loyal Clark, of the Huntington Rubber Mills, Portland, Oregon, who early realized that rubber models should and could replace and improve upon the old-time conventional manikins of painted wood, papier maché, and other rough, clumsy, and inflexible material. A talented, painstaking student, he won the hearty cooperation of the Oregon University Medical School and enjoyed in all experiments the facilities afforded by the Huntington rubber factory. All the organic and other clinical material required for making the patterns for the molds was supplied by the medical faculty, who also checked up every detail in the finished products, with the result that Mr. Clark's first anatomical model, an obstetrical manikin, has been greeted as a real find.

Simulating the Parturitive Process

The new working model is said to be the first that has ever been designed not merely to indicate the appearance and location of the female abdominal organs, but to also illustrate their arrangement and condition immediately prior to childbirth, duplicating almost natural conditions. So well does it function that deliveries can be made with practically any fetal presentation, and the soft abdominal rubber wall makes it possible to feel or palpate the exact position of the fetal body. The latter in the old models was made of leather and was uncouth in design and hard to manipulate.

The new rubber replica of an average 7½-pound infant in its latest prenatal stage, is not only in form but in color, texture, and rigidity strikingly naturalistic.

One considerable advantage of the new manikins is that they are unbreakable, they can not be damaged by falling on concrete floors, and the colors are unchangeable. Mounted on a metal stand with a tilting and revolving joint, it is possible to place them in any position for examination or instruction. One feature that is especially commended is the hinging of the abdominal wall at the breastbone base.

Intricate Aluminum Molds

The molds used in forming the rubber manikin are of aluminum, a separate one being used for each organ and the many appendages. Most of them had to be intricately made because of considerable "back-draught" involved in getting details of the abdominal cavity and pelvis. A difficult task, too, was getting suitable rubber compounds for the various organs. It has been said that it is scarcely the kind of work that can be put into mass production, and for a long time it is probable that each product will have to be a hand job throughout.

The new product is said to be only the forerunner of many others in its class that will be supplied for American and foreign educational institutions in the near future. Work on a male manikin has already progressed so far that it can be marketed in a few months.

This obstetrical manikin is made entirely of rubber. In the abdominal cavity are shown all the organs in the position found at term. The liver, gall-bladder, pancreas, spleen, stomach, kidneys, arteries, veins, nerves, muscles and bones are revealed in colors essentially as found in life.

SHALE RUBBER TIRE TREAD

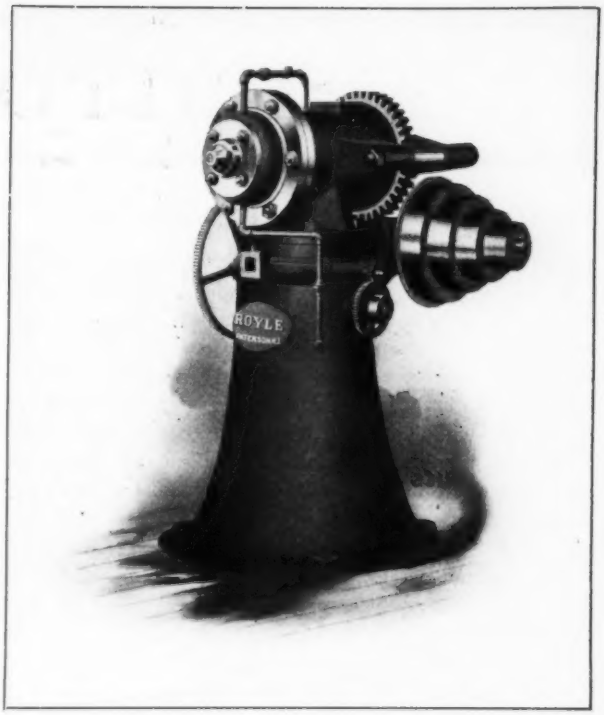
Oil bearing shale has long been regarded as a practically limitless future source of petroleum, and now a western chemist, Augustus R. Lendner, of Perris, Riverside county, Calif., is convinced that from the same clayey rock substance the rubber trade will ultimately derive a very considerable part of its basic material. In fact, he has produced from a species of shale in the hills near his home through a process, on which he has been working for several years, a material which in many ways resembles, when suitably compounded and cured, the soft rubber found in many products, and which it may largely replace if economical production is assured.

The shale, which is rich in bituminous-like material, has been named Cambranite, after one of Mr. Lendner's associates; but Mr. Lendner says that any good hydrocarbon-bearing shale may yield good results with his process. The latter involves heating extracted mineral oil with a vegetable matter until a black, gummy substance is produced, which can be used up to 61 per cent in a compound when vulcanized under heat and pressure.

The cured shale rubber product has much resilience, tensile strength, and abrasive resistance. On a tire treaded with the Cambranite rubber, as it is called, mounted on a car with three other balloon tires of noted makes, it is stated that after a 4,000-mile run over rocky roads scarcely any wear was noted, while the other tires were severely worn. Had it not been taken off for exhibition, Mr. Lindner says it would have run 8,000 miles.

An Historic Tubing Machine

This is the original tuber known as the "bell-base" type that was designed by Vernon Royle, president of John Royle & Sons, the first one having been built in 1880



THE semi-centennial anniversary of the introduction of that universally esteemed rubber working device, the tubing machine, is approaching. In fact it is now 47 years since it was invented by Vernon Royle and introduced by him in the form here pictured. The first of these "bell base" tubes, as it is familiarly known, was designed and built in 1880 by Mr. Royle. Comparatively little was then known of the requirements for working rubber and the machine was a venture into a new field.

This first tubing machine had an open jacket cylinder for admission of steam and water and the head was likewise cored out and the two parts connected by piping as shown in the illustration. This arrangement did not permit separate control of the temperature of the head of the cylinder. The feed throat was a square opening directly above the center of the stock screw and it was customary to force the compound in with a stick or wooden pusher. The dies and cores in these early machines were made very long. The drive of the machine was of the worm gear type, a cast iron worm and a cast iron worm wheel. At that time there were no means for making the highly perfected worm gear units now available. The crudities of the cast iron drive caused serious difficulties which later led to redesign of the machine for the spur gear type of drive since used.

This early design provided for an apron take off mechanism as indicated by the gear seen projecting from the rear of the stand below the head of the machine. The original machine has been modified until the present type has an especially fine kind of modern worm gear unit enclosed and running in oil. The feed throat has been changed to a tangential position and otherwise improved to the point where the machine feeds itself requiring no stuffing or feed rolls, but automatically draws in the compound keeping the stock screw full. The water jacketing of the cylinder has evolved to a progressive annular ring type closed by a renewable bushing and with separate temperature control of cylinder and head.

In the early history of the machine, stock screws of various depths and pitches were made for various kinds of work. These screws were cast. The evolution of this part has resulted in dispensing with the variety of pitch variations and standardizing on a decreasing pitch type of screw milled from the solid steel bar.

The first of the bell base tubing machines was sold to the New York Belting & Packing Co., Passaic, N. J. With all its crudeness it was found so useful that they soon were running it both day and night. About a year afterward another was sold to the branch factory of the same company at Sandy Hook, Conn. Taking this as an indication that there was after all some prospect of doing business with the machine, Mr. Royle armed himself with some photographs of the first one and made a trip to Trenton where he obtained orders for seven or eight of the machines in one day. From that time on the tubing machine was a factor of growing importance in the rubber business.

The products made largely or entirely on these machines were tubing for use as such, or as linings in water, steam, air and other hose; insulation of wire for electric purposes, and running stock to be cut up as blanks for molded articles. Originally the field for turbine machines was restricted to mechanical rubber goods, insulated wire and hard rubber rods and tubing. For many years they have been part of the equipment in rubber footwear factories for the manufacture of boot straps. For this purpose the tubing machine was first used by The Boston Rubber Shoe Co., introduced in 1893 by Webster Norris, who at that time was assistant superintendent of the company's Malden plant. Straps were then produced at high speed by simply insulating cemented hemp cord with rubber compound to suitable gage and cutting them to proper length to be inserted as finger loops in the boot tops.

Doubtless numerous other instances exist where the tubing machine has displaced hand work and other machines for large scale production of specialties. It can be said that a rubber factory or a rubber compounding laboratory without a tubing machine would be as great an anomaly as a machine shop without a lathe.

REMOVING RUBBERWARE BLOOM

The practice of removing bloom, or sulphur efflorescence, from rubberware by washing the latter with carbon disulphide is deprecated as a makeshift. While such a solvent of sulphur enables the latter to be wiped cleanly from the surface of goods, the advantage is but temporary for the sulphur will sooner or later reappear on the bared outside, varying with the density of the vulcanized mass. The method of correcting the trouble by oven heating, is liable to deteriorate the goods by over curing.

EDITORIALS

Production Cost Drifts Downward

SO various have been the estimates regarding actual cost of producing and delivering crude plantation rubber that it is a relief to get an opinion on this much-mooted subject from a conceded authority, H. Eric Miller, one of the foremost members of the British Rubber Growers' Association. In a recent address he stated that while in 1910 production cost had averaged 2s. per pound, in 1915 it fell to 1s., but that "now an average estate on full economic output can land its rubber in London warehouses at an all-in cost of about 10d. per pound." Of course, it rests with buyers to decide whether or not a selling price of 20d. affords producers more than a fair profit or provides too generously for expansion under restriction.

* * *

Vulcanizing Gutta Percha

AN impression still prevails widely, that gutta percha, though having a hydrocarbon formula akin to that of rubber, can not like the latter be vulcanized. Gutta percha can, however, be "sulphured" with or without heat and its properties improved in several processes, according to rubber authorities. One of the simplest processes is that wherein a concentrated solution of gutta percha is first made with carbon disulphide and to such fluid is added a solution of chloride of sulphur. It is said that the larger the proportion of sulphur chloride the greater will be the hardness of the resulting product; and that by using about 15 per cent of the chloride a substance is obtained practically equal to horn.

Many now unfamiliar uses may be made of gutta percha if production of the better grades can be increased and the price reduced. It has also been pointed out that one of the most urgent needs in connection with the fabrication of this valuable gum plastic is that of a very efficient anti-oxidant; but doubtless this will be provided, as also an effective accelerator, when more and cheaper gutta percha comes into the market.

* * *

Smashing Rubber Like Glass

RUBBER is so generally regarded as the ideal shockproof substance that many learn with surprise that under certain conditions it wholly loses its resilience and resistance to deformation and becomes as brittle as glass. This happens to raw rubber when it has been quickly removed from a bath of liquid air, about 140 degrees C. below freezing, a hammer stroke causing it to fairly fly into smithereens. This fragility is said to continue even up to 60 degrees below C. zero.

Service Beyond Requirements

THE American rubber industry is keeping well in the forefront of the world-wide standardization movement. Not only are better methods being constantly devised for mass production, but excellent headway is being made in the elimination of excess sizes and unnecessary varieties. This tends to lessen waste, increase profit, and also to put American producers in a position to better withstand foreign competition. Gratifying as is the gradual reduction in unit cost, even more encouraging is the stress being put upon quality. This pride in production is reflected in many ways, and especially in the longer life of many present-day rubber products as compared with the goods of even a few years ago. Purchasers are also getting more particular. In many manufacturing lines there is a decided tendency to substitute performance, or service, requirements for composition specifications. Even in this respect the rubber industry of the United States has not been found asleep at the switch.

As though anticipating this more exacting buyer attitude, tire makers, for example, have kept ahead of requirements, increasing so much in the service and performance, even trebling the life of tires, that other industrialists regard their progress and achievement as little less than phenomenal.

* * *

Latex-Waterproofed Paper

PAPER may be waterproofed with rubber, balata, or gutta percha latex and strong adhesion of the coating insured by adding resin in a colloidal state to the latex. A solution to be added to the latex may, according to the results desired, contain shellac, alkali, and water, with or without vulcanizing agents, accelerators, fillers, dyes, glue or other sizing material, etc. The process is patented.

* * *

Cellulose Silk for Tires

THAT viscose or cellulose strands may before long largely replace cotton cord in automobile tire construction, is the forecast of an English textile expert, Major A. B. Shearer. Speaking before the Institution of the Rubber Industry recently, he said: "Artificial silk in the near future is certain to be far stronger than cotton. Quite possibly it will be used in the manufacture of motor car tires and airplane fabrics. It has regularity, covering power, and strength, and it is as near as can be got to an ideal textile fabric. A spider-like web of fine filaments can be produced if required."

What the Rubber Chemists Are Doing

Reclaim Symposium[1]

Pigment Reenforcement of Reclaim

H. A. Winkelmann and E. G. Croakman

The Philadelphia Rubber Works Co., Akron, O.

COMPOUNDING ingredients of many types are in use in rubber compounds and, although their effect on rubber has been extensively investigated, there has been very little work published to show their effect on reclaim alone. The behavior of reclaimed rubber in compounds which also contain crude rubber, accelerators, and pigments is well known. The presence of these variables makes it impossible to determine the effect of the pigment on the reclaim itself. In this study we propose to show (1) the effect of varying volume loadings of different pigments on a whole-tire reclaim cured with sulphur, (2) the effect of accelerators and activators, and (3) the effect of curing at lower temperatures. With crude rubber the desired physical properties may often be obtained by cure or by the combined effect of cure and the reenforcing action of compounding ingredients. Owing to the degree of disaggregation of the reclaimed rubber the effect of cure is greatly decreased and the action of reenforcing pigments is necessary to bring out the maximum physical properties of the reclaim. The soluble and insoluble phases of reclaimed rubber differ in chemical and physical properties, indicating varying degrees of disaggregation of the rubber hydrocarbon.

Reclaimed rubber affords a very good medium for the dispersion of pigments. Dispersions of pigments in a reclaim may serve a dual function in improving both the physical properties and the working conditions. A pigment, to function as a reenforcing agent, must absorb the rubber, resulting in a "drying up" effect of the more highly disaggregated portion of the reclaim. A pigment must reenforce every portion of the reclaimed rubber hydrocarbon before it can be classed as a reenforcing pigment.

The reenforcing action of pigments such as whiting, barytes, blanc fixe, clay, catalpo, zinc oxide, kadox, thermatomic carbon, and carbon black has been studied in a whole-tire reclaim. For purposes of comparison a standard grade of mineral rubber was also used. The whole-tire reclaim used had a rubber value of 57 per cent. The same lot of reclaimed rubber was used throughout. Varying volumes of each pigment—viz., 2.5, 5, 10, 15, and 20—were added to 100 volumes of the reclaim and cured with 5 parts of sulphur. This volume-loading range insures both a minimum and a maximum loading effect. Each compound was cured for lengths of time varying from 15 to 55 minutes at 287 degrees F. (141.7 degrees C.). The reenforcing action of each pigment on the reclaim and the rubber hydrocarbon in the reclaim was thus observed without the presence of other factors.

Two methods of mixing were used to insure the best dispersion possible and to serve as a check throughout the work. In one series of experiments the pigments were added to the unfinished reclaim and then refined; the sulphur was then added. In the second series the pigments and sulphur were added to the finished reclaim on the mixing mill. Owing to the close agreement of the results obtained by the two methods only the experiments in which the pigments were refined into the reclaim will be reported. Refining versus mixing did not show marked differences in physical properties of the 5 to 10-pound batches which were used. In general, when the pigment was refined into the reclaim a higher elongation was obtained, although the tensile strength was not always increased. The refining of pigments and reclaim in factory practice gives better dispersion due to breaking up of pigment agglomerates. The results are improved physical properties and a smoother reclaim, depending upon the pigment used.

A study of the physical properties of the compounds containing various pigments shows that carbon black is the only pigment that has a marked reenforcing effect with increasing volume of pigment. Twenty volumes of carbon black still show an improvement in the physical properties. Thermatomic carbon, clays, and zinc oxides show some effect, whereas the other pigments show scarcely any. Large amounts of whiting, barytes, and blanc fixe can be compounded into a reclaim without appreciably affecting the stress-strain curve or showing a serious overloading effect.

Effect of Sulphur Vulcanizing Reclaim

R. E. Cartlidge and H. L. Snyder

The Akron Rubber Reclaiming Co., Barberton, O.

EXPERIMENTS were made with straight reclaim stock as follows: One hundred pounds of washed alkali tire reclaim was selected and from it all the reclaim used in the following tests was cut. By varying the sulphur percentages from 1.5 per cent to 6.0 per cent on the reclaim in straight reclaim-sulphur mixes one set of cures was obtained. These were made at intervals of 5 minutes. All cures were made at 142 degrees C. (287 degrees F.) in the conventional type of horizontal press. Dumbbell test strips were cut from each slab and tested on a modified Olsen tensile machine, for loads at chosen elongations as well as breaking tensiles and elongations.

The results for the 25-minute cure indicate a surprising flatness after a minimum of 3.0 per cent of sulphur is added. Percentages less than that plainly show an undercure throughout. The only noticeable change in physical properties is in the stiffening of the modulus of rigidity progressively to the maximum percentage of sulphur present. This modulus also increases as the time of cure of any one sample increases. The ultimate tensiles of the 25-minute cure pass from a minimum at 2 per cent sulphur, or below, to an approximately constant maximum from 3 per cent up to and including the maximum amount of sulphur added.

A typical tire tread formula was used in making up the compounds for another set of cures to determine the effect of varying the sulphur in a compounded stock. Cures were made at 15-minute intervals.

FORMULA

	Parts		*Parts*
Rubber	35.0	Stearic acid	0.5
Reclaim	35.0	Mineral rubber	5.0
Carbon black	17.0	Sulphur	Variable
Zinc oxide	5.0	Accelerator	1.0

The sulphur percentages were varied from 1.5 per cent to 5 per cent on the reclaim. In all the compounds 4 per cent of sulphur was figured on the crude rubber present in addition to that added for vulcanizing the reclaim.

To obtain the optimum results in curing compounded stocks containing whole tire reclaim, a minimum of 2.0 and a maximum of 2.5 per cent sulphur are required. This range of sulphur content, based on the total weight of reclaim in the compound besides the 4 per cent added for curing the crude rubber present, gives the flattest and longest curing range in conjunction with the highest physical qualities. Three per cent of sulphur on the straight reclaim-sulphur mix gives the maximum physical properties.

[1] Papers presented before the Division of Rubber Chemistry at the 74th Meeting of the Amer. Chem. Soc., Detroit, Mich., September 5 to 10, 1927. Condensed from *Indus. & Eng. Chem.*, February 1, 1928.

Value of the Rubber Hydrocarbon in Reclaim

W. W. Vogt
The Goodyear Tire & Rubber Co., Akron, O.

TIRE tread stocks containing reclaim were so compounded that their ultimate composition was the same except for the percentage of reclaimed rubber hydrocarbon substituted for new rubber hydrocarbon. Cures were adjusted to give the technical optimum in the same time of cure. The cured stocks were subjected to tensile and abrasion tests by five methods. The results show that the value of the reclaimed rubber hydrocarbon varies from zero, when substituted in small percentages, up to a maximum of 50 per cent of the value of new rubber, when compounded in large percentages.

Rate of Cure of Reclaim

Norman A. Shepard, Henry F. Palmer, and George W. Miller
The Firestone Tire & Rubber Co., Akron, O.

THE authors of this extended research summarize their conclusions as follows:

The rapid rate of cure of reclaimed rubber, while undoubtedly influenced by the alkali used in the reclaiming process, is only partially attributable to the presence or influence of alkali. Not only is this clearly shown by the experimental data, but by the fact that reclaimed rubber prepared in the absence of alkali, though slower curing, is still much faster in curing rate than new rubber.

In spite of the plausibility of the theory that depolymerization or disaggregation under the influence of heat and mechanical working is responsible for the rapid rate, the experimental data obtained by subjecting new rubber to devulcanization temperatures do not support this.

From the data presented it appears that the chemically combined sulphur in reclaim is not an important factor in the rate of cure. This point is being further investigated, as is also the influence of residual accelerator and of oxidation products.

While the amount of combined sulphur in reclaimed rubber appears to have little to do with the rate of cure, its influence on the aging qualities of compounds containing reclaim is pronounced, reduction in the combined sulphur leading to better aging. Consequently the problem of true devulcanization in a chemical sense is one warranting renewed interest.

As a result of this study of reclaimed rubber, the writers are led to the conclusion that in compounding with reclaimed rubber it is highly desirable, and quite necessary from an aging standpoint, to use a low concentration of sulphur, and to reduce either the time or temperature of vulcanization in order to obtain the best results.

Factors in Processing Reclaim

P. S. Shoaff
The Goodyear Tire & Rubber Co., Akron, O.

PRODUCTION of reclaimed rubber of uniformly good physical and chemical properties is dependent first upon judicious classification and blending of raw materials. Grinding to a state in which no large particles are present, but without an excess of fines, allows a minimum devulcanizing time at a given temperature, decreases the tendency to depolymerize to an objectionable extent, and reduces the requirement for softeners. These conditions facilitate further processing to a smooth product of good quality with the desired plasticity and with optimum compounding, milling, calendering, and tubing characteristics.

Devulcanization at high temperatures tends to reduce the tensile slightly and to increase the elongation as compared with treatment at lower temperatures. Alkali reclaims require efficient washing to remove residual caustics and the recovery of fines from the wash liquors involves problems of settling and filtration or screening. Drying of wet-processed reclaims at high temperatures or for an excessively long time results in tacky products, just as does over-devulcanization. A minimum amount of milling and refining at normal temperatures is desirable to preserve the quality, therefore previous processing should be thorough and uniform.

The comment is frequently made that there have been no fundamental developments in the art of reclaiming rubber since the basic conceptions of nearly thirty years ago. This is essentially true and improvements in processing have been confined mainly to the adaptation of more efficient manufacturing apparatus. But there has been progress in the raising of quality standards as a result of technical control and a better appreciation of just what characteristics constitute a valuable rubber substitute. The day has just arrived when the research chemist and the engineer have joined forces in a tardy campaign to attempt really to regenerate vulcanized rubber.

Present-day processes never reimpart the two properties of solidity and elasticity exhibited by raw rubber. Vulcanized rubber, especially after long use, has undergone such complex physico-chemical changes that we may never restore it to its original state, though it is certainly not beyond the realm of possibilities in this day of seeming miracles.

Rubber Hardness Tester

Erle C. Zimmerman and R. W. Brown
The Firestone Tire & Rubber Co., Akron, O.

ALL hardness testing instruments operate on the same fundamental principle—i. e., the application of a load upon a point arranged to penetrate the rubber, the hardness of which is being determined, with an instrument dial indicating the amount of penetration. Obviously, to secure accuracy the applied load must be kept constant and at a predetermined value. Also, the shape of the penetration point must be accurately maintained. In designing their instrument, the authors chose values of 1, 2, and 3 pounds, or 500, 1,000, and 1,500 gm., standardized the penetration point as a semi-sphere, 3/64 inch or 1.25 mm. radius, and made provision to measure the penetration in thousandths of an inch or hundredths of a millimeter with 0.100 inch or 2.50 mm. maximum penetration. These values were selected from a number of different values tried and found to cover satisfactorily the range of hardness ordinarily encountered in vulcanized rubber compounds.

Fig. 1—Improved Penetrometer

The desirability of applying the instrument to the rubber with a definite force resulted in the design and construction of the improved model, the mounted form of which is shown in Figure 1. By removing the instrument from its supporting bracket, it can be conveniently used as a hand instrument. Arrangements are provided whereby it is impossible to apply the instrument to the rubber with a force greater than the predetermined value. The cross-sectional view in Figure 2, shows how this has been accomplished. The outer shell, 1, fits in the supporting bracket and is moved up and down by a rack and pinion. The casing, 2, with its ends, 4 and 6, acts as a plunger inside of the shell, 1, and is held under uniform tension by spring 3. The collar, 9, is firmly attached to the shell 1, and serves as a support for spring 3.

The spring 7 with its support, 8, and the point 5 are standardized parts used in all types of penetrometers. This mechanism is attached to the indicating dial shown at the upper part of end 6.

Penetration is secured with the loads of 1, 2, and 3 pounds or 500, 1,000, and 1,500 gm on the penetration point. The 3-pound (1,500-gm.) spring covers the range of hardness of various rubber compounds quite adequately. If the interest is confined to soft rubber compounds, the 1-pound (500-gm.) spring is recommended. The 2-pound (1,000-gm.) spring is only necessary for some types of highly specialized testing.

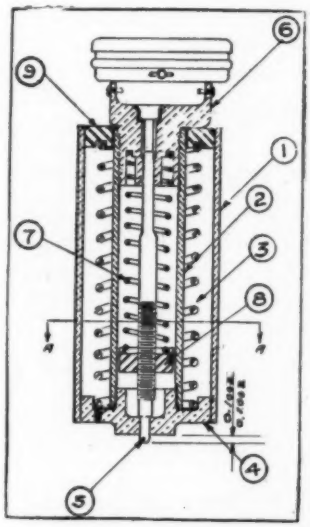


Fig. 2—Cross Section of Penetrometer

The maximum penetration permissible for accurate hardness indication occurs at the point beyond which the stock takes a detectable permanent set. For the majority of rubber compounds a penetration of around 0.050 inch (1.25 mm.) has been found desirable and the permissible maximum in nearly all cases lies at or slightly above 0.100 inch (2.50 mm.). Hence the load on the penetration point should be adapted to the hardness of the rubber compound so that the penetration lies within the above limits.

The thickness of the stock influences the instrument reading. Test slabs should be at least 0.5 inch (12 mm.) thick and in all comparisons slabs of the same thickness should be used. Hardness on test slabs as thin as 0.25 inch (6 mm.) can of course be compared with each other, but it is well to test a 0.5-inch (12 mm.) slab of one of the stocks under consideration for reference. It is desirable to support all stocks less than 1 inch (25 mm.) thick on a flat, rigid surface whenever possible. However, reasonably accurate results can be secured by a skilled operator with a hand instrument on such irregular surfaces as the non-skid button of the pneumatic tire.

The hand instrument is particularly useful in measuring hardness of pneumatic tire treads. With rare exceptions, tire sections are so thick that the effect of thickness on the penetration value is negligible. The hand instrument may also be used conveniently for solid tires and miscellaneous molded articles such as shock insulators, motor supports, heels, soling, etc. In no case is it necessary to cut rubber products and prepare special samples for penetration tests. The penetrometer can be operated with great speed, it being possible to make as many as fifteen tests per minute so that a large volume of product can be tested in a short time. The mounted instrument is, of course, more accurate than the portable instrument, and it serves well for laboratory control work or research compounding.

A multiple-cavity mold can be used to advantage in making slabs of uniform thickness. As pointed out previously, these slabs should be at least 0.25 inch (6 mm.) and preferably 0.5 inch (12 mm.) thick. The mounted instrument can also be used for small rubber articles having parallel surfaces. The penetrometer is equipped normally with a 3-pound (1,500-gm.) spring which is suitable for all types of rubber stock from hard rubber down to fairly soft rubber. The lighter springs may be used to advantage for very soft stocks.

RUSSIA, ACCORDING TO STATISTICS PREPARED BY THE AMERICAN Motorists' Association, has one motor vehicle to every 6,723 inhabitants. America has one automobile to every five persons!

SODIUM SILICO FLUORIDE—COAGULANT

In an article on "Sodium silico-fluoride as a coagulant," Dr. de Vries detailed the difficulties experienced in Java with this coagulant which consequently could not be generally recommended. At the experiment station of the A.V.R.O.S., East Coast Sumatra, N. H. van Harpen carried out certain tests which showed that the difficulties met with in Java could probably in most cases be overcome by simple means. It was found that latex having a dry rubber content of 15 per cent could be coagulated with sodium-silico-fluoride; that the addition of a little formic acid to the S.S.F. made it possible to coagulate latex of 20 per cent dry rubber content with a clear serum; the percentage of off-sheet is lower when S.S.F. is the coagulant (absence of air-bubbles); the rubber content of the sera of S.S.F. and formic acid is equal while the former is a cheaper coagulant than the latter. Sheets prepared with S.S.F. are less susceptible to molds than formic acid sheets. When sodium silico fluoride is the coagulant, aluminum pans or tanks should not be used, but there is no objection to zinc pans or tanks.

OXYNONE

Oxynone is a definite crystalline chemical compound now being offered to the rubber industry. It is an amine type material possessing both accelerator and anti-oxidant effects toward rubber. Its accelerating power is quite mild in pure gum stocks but is very pronounced in tire tread stocks as it is absolutely unaffected by carbon black. As an accelerator it requires full curing temperatures similar to DPG, DOTG and Hexa. In a quality tread its accelerating power is equal to that of DOTG and in mechanical goods stocks it is superior to DPG. Its curing range is long and the modulus of stocks containing it increases on prolonged cure and on aging. In white and light colored stocks, oxynone exerts a more or less perceptible darkening effect.

ALMEIDINA GUM

Almeidina is derived from the milky juice of *Euphorbia rhipsoloides*, native to Angola. It comes in round loaves weighing about 500 gm., is compact, not brittle but non-elastic although heat is said to render it temporarily (for six to ten hours) more elastic than rubber. As it is entirely soluble in rubber solvents (gasoline, benzine, etc.), the Lisbon firm which exports it, suggests that it might be used in rubber manufacture. At present there is a limited market for this product in England and Germany where it appears to be used in the manufacture of celluloid.

A RUBBER LIGHTER THAN CORK

Important industrial applications are predicted soon for foam rubber, said to be the lightest known solid substance, it having about one-quarter the specific gravity of cork. Unlike sponge rubber, which has relatively large open pores and thick connective tissue, foam rubber is not ordinarily permeable to fluids. Not only are its resilient and buoyant properties remarkable, but it is said to possess unequalled heat insulating qualities. This newer rubber product is formed by injecting an inert gas under high pressure into the compound while it is being vulcanized, such distension affording a material with a myriad of tiny cells separated with an exceedingly thin membrane. It may serve for lining refrigerators, life preservers, in making upholstery and other articles.

RUBBER DIVISION MEETING

The American Chemical Society meeting will be held at St. Louis, Mo., the week beginning April 16. The society's headquarters will be at the Chase Hotel. The Rubber Division will be at the Coronada Hotel, where all of its sessions, scheduled for Wednesday and Thursday, April 18 and 19, will be held, including the dinner set for Wednesday evening. The Polymerization Symposium has been postponed until the Boston meeting next fall.

American Rubber Technologists

¶Technical superintendents, process and development engineers in rubber manufacturing and reclaiming plants, research, testing and service laboratories are invited to send their biographical data to us for publication

SIDNEY M. CADWELL, chem. *b.* Boseman, Mont.; B. S. Chicago U., 1914, Ph D. Chicago U., 1917; asso. member Otho S. A. Sprague Inst., 1916-1917; research chem., Federal Dyestuff & Chem. Corp., 1917; Capt. Chem. Warfare Service, U. S. A., 1918; research chem., U. S. Rubber Co., since 1919; inventor of accelerators of vulcanization and anti-oxidants for rubber preservation. *Member:* Am. Chem. Soc., Am. Inst. Chem. Engrs., Gamma Alpha, national president and secretary in 1927; Chemists Club, Leonia Tennis Club, governor of club 1922. *Address:* 561 West 58 St., New York, N. Y.

Frank Everett Rupert, chem. *b.* Nov. 16, 1889, Mendon, N. Y.; Hobart Coll., Geneva, N. Y.; B. S., U. of Mich., 1912; M. S., U. of Wis., 1915; graduate work U. of Wis., Columbia U. and Harvard U.; teacher of chem. and math., Kiskimitas School, Salisbury, Pa., 1912-1915; teacher math., State Teachers Coll., Mansfield, Pa., 1915-1918; chem. instructor, Simmons Coll., Boston, Mass., 1918-1920; phys. chem. instructor, Carnegie Inst. of Tech., Pittsburgh, Pa., 1920-1922; asso. phys. chem., C. W. S., Edgewood Arsenal, 1922-1924; research chem., Fisk Rubber Co., Chicopee Falls, Mass., 1924-1927; research asso., U. S. Bu. of Standards, Washington, D. C., employed by Physical Testing Committee of Rubber Division, Am. Chem. Soc. *Author:* "Determination of Potassium by Perchlorate Method." *Address:* Rubber Section, Bureau of Standards, Washington, D. C.

Howard O. G. Hutchens, engr. *b.* Aug. 26, 1894, Indianapolis, Ind.; high schools Indianapolis and Milwaukee, Alexander Hamilton Institute course; costing dept., G. & J. Tire Co., Indianapolis, Ind., 1909-1911; costing dept., Federal Rubber Co., Cudahy, Wis., 1911-1917; supt. of mill, calender and press depts., Gillette Rubber Co., Eau Claire, Wis., 1917-1918; Motor Transport Unit No. 305 U. S. A., 1918-1919; supt. mill and calender depts., Archer Tire & Rubber Co., Minneapolis, Minn., 1919-1920; supt. proofing dept., Vulcan Proofing Co., Brooklyn, N. Y., 1920-1921; supt. bicycle tire dept., 1921-1923 and asst. factory mgr. Gillette Rubber Co., since 1923. *Member:* Masons. *Address:* 719 Second Ave., Eau Claire, Wis.

Harold H. Clark, engr. *b.* 1892, Buffalo, N. Y., M. E. Cornell U., 1915; machine designer, Goodyear Tire & Rubber Co., Akron, O., 1917-1921; machine designer, Seiberling Rubber Co., 1921-1925; supt. of engr., Dunlop Tire & Rubber Co., Buffalo, N. Y., since 1925. *Address:* 135 Tacoma Ave., Buffalo, N. Y.

Harry Raymond Ferguson, chem. engr. *b.* Aug. 22, 1903, Brooklyn, N. Y.; B. S., M. I. T., Cambridge, Mass., 1924; chem. Manhattan Rubber Mfg. Co., since 1924. *Member:* Alpha Chi Sigma. *Address:* 56 Myrtle St., Rutherford, N. J.

Ralph W. Hutchens, engr. *b.* Sept. 3, 1891, Indianapolis, Ind.; public schools and Hornell Business Coll.; engr. dept., G. & J. Tire Co., Indianapolis, Ind., 1906-1916; engr. dept., 1906-1916; secy. and fact. mgr., 1920-1922, vice pres. and genl. mgr., Gillette Rubber Co., since 1922; inventor of many patents on automatic machinery for rubber manufacturing, tire designs, etc. *Member:* Am. Soc. Mechl. Engrs., Masons, Shriners, Elks, K. P., on Boards of Y. M. C. A. and Chamber of Commerce, Eau Claire, Wis. *Address:* 1301 State St., Eau Claire, Wis.

William B. Maxim, engr. *b.* Dec. 1, 1871, Rutland, N. Y.; Worcester School of Technology, Worcester, Mass.; Coyne School of Eng., Boston, Mass.; asst. supt. machine shops, Norton Emery Wheel Co., Worcester, Mass., 1894-1903; chf. engr., Boston Woven Hose & Rubber Co., Cambridge, Mass., 1903-1909; chf. engr., N. Y. Rubber Co., Beacon, N. Y., 1909-1923; mechl. supt., C. Kenyon Co., Brooklyn, N. Y., since 1923. *Member:* Masons. *Address:* 53 Seventy-Sixth St., Brooklyn, N. Y.

Harry S. Alexander, mech. engr. *b.* Apr. 28, 1887, Washington, Pa.; A. B. Washington and Jefferson Coll., 1907; A. M., 1907; B. S., M. I. T., 1911; exper. dept., Goodyear Tire & Rubber Co., Akron, O., 1911-1913; asst. mgr., planning dept., 1913-1917; Capt. Air Service, U. S. A., 1913-1919; Franco-Amer. Mfrs. Asso., 1919-1921; exper. engr., Seiberling Rubber Co., since 1926. *Member:* Kappa Epsilon, Mason. *Address:* 442 Aqueduct St., Akron, O.

Robert Parke Hall, chem. *b.* Aug. 8, 1900, Olena, O.; B. E., U. of Akron, 1924; chf. chem., Buckeye Brass & Mfg. Co., Cleveland, O., 1924-1925; plant mgr., C. P. Hall Co., Akron, O., since 1925. *Author:* Papers on bronze bearing compositions and babbitt oxidation. *Member:* Akron U. Club, Am. Geog. Soc., Sons of Am. Rev. *Address:* 834 Avon St., Akron, O.

John Harry Matthews, mech. engr. *b.* March 3, 1893; M. E., Stevens Inst. Tech., Hoboken, N. J., 1914; various engineering positions, Manhattan Rubber Mfg. Co., Passaic, N. J., 1914-1917; 2nd Lieut. U. S. A. Air Service, 1917-1918; prod. mgr. belting, molded goods, brake linings, etc., depts., Manhattan Rubber Mfg. Co., since 1918. *Member:* Tau Beta Pi. *Address:* Manhattan Rubber Mfg. Co., 45 Beverly Rd., Passaic, N. J.

George Lee Hassert, chem. *b.* Aug. 25, 1894, Bloomsburg, Pa.; B. S., Pa. State Coll., 1915; chem., Aetna Explosives Co., 1915-1916; Hershey Chocolate Co., 1916-1917; J. G. Brill Co., 1917-1918; General Chemical Co., 1918-1924; Brooklyn Navy Yard, N. Y., 1924-1925; chem. Manhattan Rubber Mfg. Co., since 1925. *Member:* Masons, Craftsman Club, Phi Kappa Phi. Address: 140 Luddington Ave., Clifton N. J.

Richard P. Milburn, engr. *b.* Apr. 5, 1894, Arcadia, Neb.; M. E. Stevens Inst. Tech., Hoboken, N. J., 1917; mach. shop, N. Y. Shipbuilding Corp., Camden, N. J., 1917-1918; U. S. Naval School for engineer officers, 1918-1919; N. Y. Shipbuilding Corp., May to Oct., 1919; erection engr., Audiffren Refrigerating Machine Co., New York, N. Y., 1919-1922; salesman, heating systems, Lord & Burnham Co., 1923-1924; salesman, Buckeye Portable Tool Co., Philadelphia, Pa., Jan. to Mar., 1925; foreman molded goods dept., Manhattan Rubber Mfg. Co., Passaic, N. J., since 1925. *Address:* 822 De Graw Ave., Newark, N. J.

Walter H. Hermann, engr. *b.* Apr. 26, 1879, Appleton, Wis.; grade schools of Wis.; N. Dak. Preparatory Coll.; Fargo Agric. Coll., Fargo, N. Dak.; asst. exper. sta., Edgerley, N. Dak.; Morgan & Wright Co., Detroit, Mich., 1905-1909; supt., Revere Rubber Co., Providence, R. I., 1910-1913; Midgley Tire Co., Lancaster, O., 1914; expr. and develop., Firestone Tire & Rubber Co., Akron, O., 1915; fact. mgr., Lancaster Tire & Rubber Co., Lancaster, O., 1916-1920; pres. Hermann Tire Building Machine Co., and Hermann Mfg. Co., treas. and gen. mgr., Columbus Tire & Rubber Co., Columbus, O. *Address.* Lancaster, O.

Matthew Klein, engr. *b.* Nov. 26, 1881, Indiananolis, Ind.; high school; asst. master mech., G. & J. Branch U. S. Rubber Co., Indianapolis, Ind., 1903-1911; supt, maintenance, Federal Rubber Co., Cudahy, Wis., 1911-1917; mast. mech. Racine Rubber Co., Racine, Wis., 1917-1918; 2nd Lieut. Ordnance Dept., U. S. A., three mos. in 1918; gen. fact. inspector, Federal Rubber Co., Cudahy, Wis., 1919-1920; supt. maintenance, McClaren Rubber Co., Charlotte, N. C.; supt., Century Rubber Wks., Chicago, Ill., since 1920; designed machinery for cutting, making and wrapping tires and beads and splicing machine for bias cutter. *Address:* 1822 South Second Ave., Maywood, Ill.

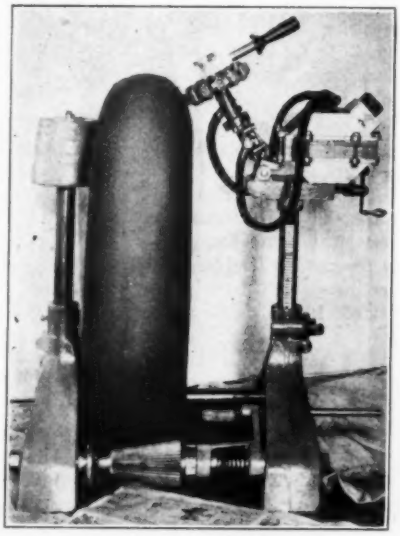
Emil William Schwartz, chem. *b.* July 25, 1897, Bridgeport, Conn.; Ph. B. (chem.) Sheffield Sci. School, Yale U., 1919; chf. chem. and rubber tech., General Electric Co., Bridgeport works, since 1927. *Member:* Am. Chem. Soc. *Address:* 893 Hancock Ave., Bridgeport, Conn.

Carl C. Daily, chem. *b.* Sept. 11, 1895, Akron, O.; B. A., Ohio Wesleyan U., Delaware, O., 1916; Akron U., 1917; Firestone Tire & Rubber Co., 1916-1917; U. S. Army, 1917-1919; chem. compounding and research, American Hard Rubber of N. Y., 1919-1921; division manager, Akron, O. plant, American Hard Rubber Co., tech. salesman, C. P. Hall & Co., Akron, since 1926. *Member:* Delta Tau Delta, Akron U. Club, Am. Chem. Soc., Masons. *Address:* 1031 Emma Ave., Akron, O.

New Machines and Appliances

Branding Device for Tires

Inevitably every tire manufacturer has need for the mechanism here pictured because some defective or damaged tires are bound to be produced and these should be indelibly marked to forestall their sale to consumers as perfect goods.



Utility Tire Brander

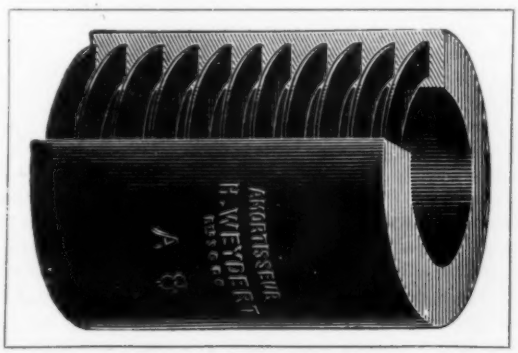
The machine illustrated admirably serves this purpose. It is built on heavy stands and has a cradle to support the tire traveling on grooved cones which are operated by a foot pedal through a ratchet action to space the characters. The printing wheel is provided with 12 characters 5/8 inch wide by 1-inch high. These are made of special bronze and may be readily changed when burned out. They are heated by 12-volt current supplied through a transformer mounted on the machine operating on 1,200 to 1,500 watts.

The characters and transformer are supported on an adjustable column that can be positioned quickly through a worm gear and requiries no locking.

As applied to marking tires, selection of characters is made by a hand wheel and a suitable lever permits the operator to brand the side of a tire quickly and permanently with any combination of figures and characters.—Utility Mfg. Co., Cudahy, Wis.

Armored Rubber Shock Absorber

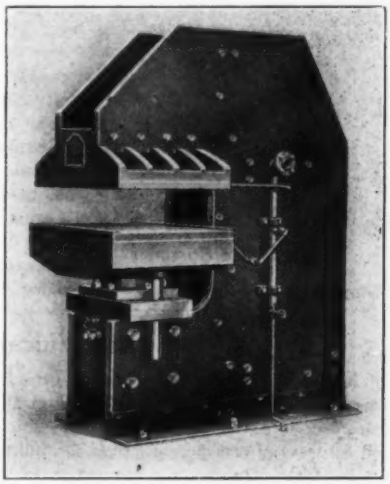
A rubber shock absorber of new design is here pictured. It is of French origin and designated as an armored shock absorber, in the form of a hollow cylinder. The armored feature consists of a steel spiral spring suitably proportioned and fully encased in a special rubber compound. The shock absorbers are adapted to replace compression springs, particularly where exacting conditions are to be met. They may be used singly or one upon another mounted in special cast metal washers serving to support them in alinement and prevent their displacement. These shock absorbers are made both in standard and special sizes to meet all requirements. Under test one of these shock absorbers stood 22,000 pounds without developing any crack or tear.—Etablissements H. Weydert, 21, Rue du Président Wilson, Levallois, Perret, (Seine), France.



Weydert Shock Absorber

Special Goose Neck Press

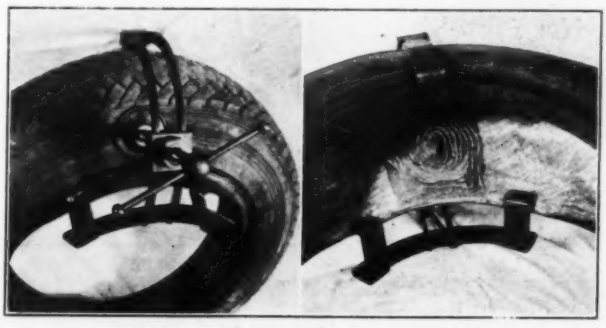
In the manufacture of special mechanical rubber goods a single opening press of the "goose neck" type is more convenient than the ordinary form. Such a press of German design and manufacture is here pictured. Its special feature is the utilization of armour plate for the supporting structure of the press which gives it rigidity and strength far beyond that of a cast frame of equal weight. The press is operated by a single hydraulic ram and is built for very severe service. The entire assembly is totally unlike that found in American built presses in which castings and tension bars are combined to form the general structure—G. Siempelkamp & Co., Krefeld, Germany.



German Vulcanizing Press

Tire Spot Repair Tool

The patented spot repair tool for heavy pneumatic tires is characterized by being capable of adjustment to the radii of the annular axis of the carcass, thus accommodating repairs either on tread or sidewalls. The tool is attached for the application of a



FRONT REAR

Abrahams Tire Repair Tool

patch on a tire by hooks that grip under the beads on both sides as pictured in the illustration. Pressure is applied to the patch by means of a hand operated screw upon a circular disk. The disk and screw are mounted slidably upon a pair of curved steel tracks which span the tire from bead to bead.—Jack Abrahams, La Reine Ave. and Main St., Bradley Beach, N. J.

Air Operated Tire Spreader

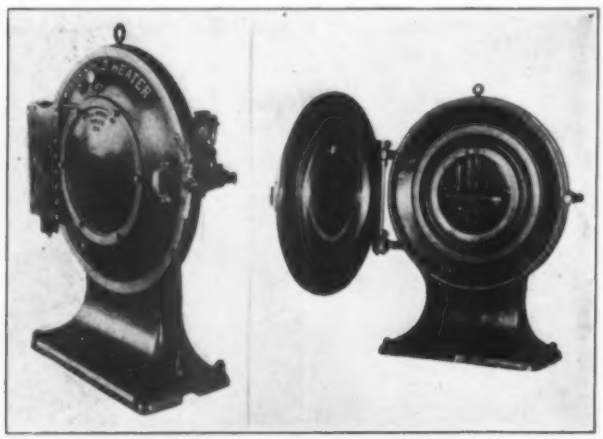
All progressive tire manufacturers and tire repair men are interested in an efficient tire spreader that can be used to quickly open any size of tire casing for inspection or repair.

Branick Tire Spreader

Such a device is here pictured as mounted on a floor stand, but it can also be fastened on a wall. In any event a slight pressure on foot pedal or pull on a handle causes the centrally located piston to be actuated by the air cylinder that extends four arms over which the tire carcass to be opened is placed. Thus in 4-seconds the tire is opened at once evenly and fully all around its circumference. In this position it can be easily turned in either direction. No injury is possible to the tire in opening it because the bead grips are wide, flat and smooth holding the casing harmlessly. It is manufactured by the Branick Vulcanizing Co., Fargo, N. D.

Watch Case Vulcanizer

The designers of the watch case vulcanizer, here illustrated, have introduced a new vacuum method of molding inner tubes. The vulcanizer is a vacuum sealed heater with only one moving part and assures uniform pressure over the full area of the door. With the mold sealed within the vacuum chamber the heat must travel toward the mold cavity.



CLOSED OPEN

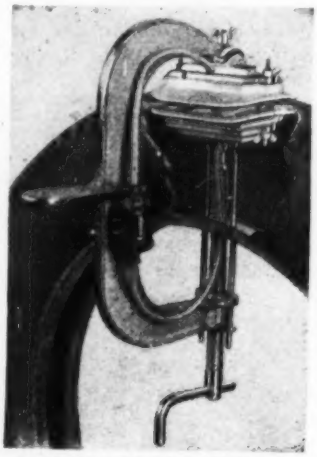
Fawick Thermold Tube Vulcanizer

In the construction of this vulcanizer there are no water or air pressure cylinders, liquid valves, locking rings, gears, cams, packing or insulation.

There are no large heat losses with this heater for its principle is essentially that of the thermos bottle. Trapping air within the mold cavity is impossible. The tube is deflated within the cavity after the cure.—Thomas L. Fawick, Racine, Wis.

Electric Spot Vulcanizer

This spot vulcanizer consists essentially of two electrically heated aluminum shoes which form the jaws of a screw clamp. The construction permits a patch to be vulcanized from both sides at the same time or from either side as desired. This appliance is adapted for repairing either tires or tubes. In the latter case flat plates are used and two tubes may be repaired at one time, one against the upper and the other against the lower plate.



Inside and Outside Vulcanizer

The electric current consumed by this vulcanizer is very small in amount, usually costing less than one cent per hour with both plates heated. It is advisable therefore, to keep the current turned on all day, so that the apparatus will constantly be ready for immediate use.

Since the shoes are all interchangeable and can be used on either upper or lower pads a variety of combinations is possible so as to reach any part of side wall or tread, both inside and outside.—The B & O Mfg. Co., P. O. Box 274, Chicago, Ill.

Compound Ingredient Scale

All rubber manufacturers do not keenly appreciate the losses in wasted materials attributable to inaccurate weighing scales. These losses begin in the compounding room where rubber, reclaim and a long list of ingredients are apportioned in batches. The more active chemical ingredients such as sulphur, accelerators and anti-oxidants, as well as colors, must be very exactly weighed in order to secure correct curing and color effects.

Exact Weight Compound Scale

A line of scales of varying capacities has been designed for exact weighing of compounding ingredients. They vary in capacity from 65 pounds by quarters to 2 pounds by ¼-ounces. The 65 pound scale is the one here pictured.

The characteristics of these scales are that they are not affected by changes of level, climatic conditions or machinery vibrations and are perfect working under dusty and humid conditions. The weights are easily read on an "over-weight" and underweight dial which makes close weighing easily possible by unskilled labor.—The Smith Scale Co., Columbus, O.

Horizontal Disk Grinder

A disk grinder is a very useful equipment for rubber factories especially for those making mechanical goods in variety. The horizontal grinder illustrated is a conveniently portable dustless motor driven machine suitable for such use. It was designed originally for burring metal articles but will prove a most convenient tool for facing rubber valves, molded blocks and numerous other specialties that require to be finished with one or more buffed or ground surfaces. The grindings are received in an attached bag.

Syracuse Grinder

The disk is solid iron, carefully balanced and motor driven from a lamp socket. It is controlled by a 2 pole push button switch conveniently located on the motor.—The Porter Cable Machine Co., Syracuse, N. Y.

Recording Hygrometer

Every fabric conditioning and constant temperature room for the physical testing of rubber and fabrics should be provided with an automatic instrument such as the wet and dry bulb recording thermometer here pictured. This type of instrument, known as a hygrometer, is particularly suitable for installations where the circulation of air is relatively poor, for example, such as would exist in a room where ventilation depends upon natural draft. A small motor-driven fan placed within this instrument draws air over the wet and dry bulbs at a uniform velocity of approximately 600 feet per minute, thereby enabling the instrument to record accurately.

Tycos Wet and Dry Bulb Thermometer

The instrument is flexible in that the air may be drawn either from the room in which the instrument is located or from a drying cabinet or other similar apparatus. The instrument can be furnished with a chart to make one revolution in either 24 hours or in 7 days as desired. The records of the dry and wet bulb temperatures are traced simultaneously by the pen. The charted temperature readings can be converted readily into percentages of relative humidity by aid of a table supplied with each instrument. —Taylor Instrument Cos., Rochester, N. Y.

Traveling Demonstration of Molded Tube Production

A commendably enterprising exhibit and demonstration was recently made by De Mattia Brothers, Inc., Clifton, N. J. This concern mounted an inner tube molding press of its manufacture upon a light motor truck and gave practical demonstrations of its operation according to the following itinerary.

De Mattia Traveling Exhibit

On February 2 the truck left Clifton, N. J., and visited the Norwalk Tire & Rubber Co., The Armstrong Rubber Co., Yale Tire & Rubber Co., Fisk Rubber Co. and Hood Rubber Co. Returning to Clifton it left February 5 and visited Lee Tire & Rubber Co., Hydro-United, Pennsylvania Rubber Co., and all the tire factories in the Akron district. From Akron it went to Mansfield and Dayton, O., returning through Columbus, Newark, Canton, Erie and Buffalo, arriving at Clifton, February 18. The exhibit traveled over 3,000 miles in two weeks, making demonstrations at all the tire factories enroute.

This accomplishment was made possible through the courtesy and interest of tire manufacturers making their inspection at the convenience of the demonstrator. In one instance the president, general manager and master mechanic of a tube factory went to the plant at 11 o'clock at night to inspect the machine.

Curved Sand Bag

A common defect of straight woven tubular sand bags, such as are commonly used for tire repair vulcanizing, is that shaping them into working position causes undue strain upon the cords on the outside of the arc of the bag. This condition is avoided in the sand bag here pictured by its being woven in circular form from graduated cords so placed to give greatest strength on the outer circumference where the old type of bag always cracks. The curved shape of the bag eliminates buckling and allows it to shape to the tire mold without being forced. The contained sand does not pack but flows to the shape of the tire and equalizes the pressure.—The American Rubber Mfg. Co., Oakland, Calif.

Tire Repair Sand Bag

Editor's Book Table

"Proceedings of the Thirtieth Annual Meeting." Part I Committee Reports, New and Revised Tentative Standards. Part II Technical Papers. American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. Cloth, 6 by 9 inches. Part I, 1,142 pp., Part II, 564 pp. Illustrated, indexed.

This annual volume of specifications, tests and technical papers is the authoritative record of approved current American engineering practice concerning metals and structural materials of every sort. Part I includes the annual reports of forty-four standing committees and four joint committees of the society. Part II contains thirty-three technical papers with discussion by experts in the field of engineering materials.

"Allen's Commercial Organic Analysis." Volume IV. Fifth Edition, entirely rewritten. Edited by Samuel S. Sadtler, Elbert C. Lathrop and C. A. Mitchell. P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa.

Volume IV of this outstanding classic on organic analysis contains an authoritative treatise by John B. Tuttle, well known as an authority on the analysis of rubber. Within the limits of sixty-one pages the author has compressed an exceedingly clear and valuable treatise covering the occurence, nature and analysis of rubber, gutta percha, balata and allied substances. This is supplemented by special articles on rubber substitutes and reclaimed rubber. Obsolete and little used methods of rubber analysis have been omitted.

The other features of the volume are Special Characters of Essential Oils; Resins; The Constituents of Essential Oils; Allied Substances; and The General Characters and Analysis of Essential Oils.

"Directory of Commercial Testing and College Research Laboratories." Miscellaneous Publication No. 90, Department of Commerce Bureau of Standards, Washington, D. C., 1928. Paper, 46 pp., 7½ by 10¾ inches.

In this publication information is given concerning 271 commercial testing laboratories, and 186 college laboratories which are used not only for purposes of instruction but also to a considerable extent for research work. The volume closes with a brief chapter on facilitating the use of specifications and explanation of the certification plan under which listed manufacturers certify their products to comply with the requirements and tests of United States Government master specifications.

"Investigations at the Imperial Institute on Samples of Plantation Para Rubber from Ceylon." Bulletin No. 47. Report on variability of Ceylon estate grades prepared in connection with the rubber research scheme. Peradeniya, December, 1927. Imperial Institute, South Kensington, London S. W. 7. Paper, 18 pp. 5⅜ by 8½ inches. Graphs.

This report treats exhaustively of the variability of Ceylon plantation rubber in the following respects: 1, plasticity; 2, time of vulcanization and tensile strength of a rubber sulphur mixing; 3, mechanical properties when vulcanized with zinc oxide and D. P. G.

"The Gummi-Kalender, 1928." By Dr. Ernst A. Hauser and Dr. Kurt Maier, and published by the Union Deutsche Verlags-Gesellschaft, Berlin, S. W. 19.

This contains a lot of useful information in its 400 odd pages. Among other items, there is a diary, a number of tables, list of organizations and associations of the German rubber industry, data in connection with rubber manufacturing processes, statistics of the world's rubber trade, German duties on rubber goods, and the business reports of a number of leading German rubber manufacturers, besides a special table of German vulcanization accelerators, compiled by Dr. Rudolf Ditmar and Andre Staffa. In all this is a handy little volume that executives and technical men, dealers and salesmen will like to have with them for ready reference or for jotting down notes.

"Marketing of Crude Rubber." Trade Promotion Series No. 55. By E. G. Holt, chief, Rubber Division, Department of Commerce. Published by the United States Printing Office, Washington, D. C., 1927. Paper, 257 pp., with 16 additional pp. for contents, foreword and acknowledgment, 6 by 9 inches. Illustrations and tables.

This report amplifies Trade Information Bulletin No. 180, Marketing of Plantation Rubber, by J. J. Blandin, special agent of the Department of Commerce, published in 1924, and includes statistics of rubber production (exports), consumption (imports), and stocks, where available, for every country of any importance in the production of crude rubber or the manufacture of rubber goods, and is intended to supply necessary information for the statistical records of rubber manufacturers and traders. Similar data have never before been collected and published in one volume.

A separate section of the report includes a discussion of restriction of rubber exported from the British Middle East, its effects on marketing and a complete statement of the restriction laws and rules in the Federated Malay States.

New Trade Publications

"Organic Colors for Rubber Goods" is the title of a 24-page booklet issued by The Rubber Service Laboratories Co., Akron, O. It contains a discussion of the properties and uses of organic colors in rubber work followed by a list of colors, their special characteristics, adaptability to various types of cures and action with accelerators. Base formulas for different types of rubber goods are included.

The Fisk Candle, an eight-page booklet of interesting happenings around the plant of The Fisk Rubber Co., Chicopee Falls, Mass., made its first appearance with the January issue. It will be published about the tenth of each month and its purpose is to promote mutual understanding among all members of the Fisk family.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has just announced the publication of a catalog of electrical supplies for 1928-1930.

"Magnetic Protection." Under this title The Cutler-Hammer Mfg. Co., Milwaukee, Wis., has issued an illustrated pamphlet of 12 pages devoted to detail description of its magnet separator pulleys and their adaptability to the separation of scrap metal from non-magnetic materials of many sorts.

Morse Silent Chain Drives has been recently issued by the Morse Chain Co., Ithaca, New York. The handbook is a ready reference for solving most any power transmission problem, and greatly facilitates the selection and design of the proper drive for any given requirement.

Department of Commerce, Bureau of Foreign and Domestic Commerce, has prepared a fifteen-page booklet entitled, "Glossary of Rubber Products Exported from United States." The glossary is for the use of exporters when making out shipper's export declarations.

"General Bulletins No. 631 and No. 632" have been issued by the General Bulletin Service of The Rubber Association of America, Inc., New York, N. Y. No. 631 comprises descriptions of crude rubber sorts. No. 632, "Rules and Regulations," is a guide to govern transactions between sellers and consumers of crude rubber in the United States.

"Gedenknummer uitgegeven naar Aanleiding van het Vijftig Jarig Bestaan van De Indische Mercuur, 1878-1928." This handsome and imposing volume, accompanied by prints of an etching, a lithograph and a painting, all Javanese subjects, has just been received from J. H. de Bussy, Amsterdam, who thus celebrates the fiftieth birthday of his well-known weekly, *De Indische Mercuur*. The latter publication, which is under the direction of a group of experts, regularly covers all that is worthwhile regarding the agricultural, financial and industrial matters of the far-flung Dutch possessions, in the East and West Indies.

For the special number, a variety of interesting articles, appropriately illustrated, considering the development of tropical agriculture, sanitation, commerce, during the past fifty years, each written by a well-known authority, have been collected. The early years of the rubber industry is the subject of a paper by A. G. N. Swart: Dr. A. W. K. de Jong discusses centrifuged latex; P. Lagaaij, the Rubber Experiment Stations; and J. N. Burger, the Dutch rubber market. Professor P. van Romburgh touches a matter of great importance to rubber producers in his article on crops that have been lost to European cultivators.

The publishers are to be doubly congratulated, first on the achievement of having successfully served a wide circle of readers for half a century, and again on the fitting commemoration of this fact.

Rubber Bibliography

COAGULATION, STRUCTURE AND PLASTICITY OF CRUDE RUBBER.—O. De Vries, *Trans. Inst. Rubber Ind.*, Dec., 1927, pp. 284-303.

MERCURY VAPOR ARC LAMP; ITS USES IN A RUBBER FACTORY.—F. G. Nagle, *Trans. Inst. Rubber Ind.*, Dec., 1927, pp. 304-311. Illustrated.

STANDARD COSTING.—G. W. Telford, *Trans. Inst. Rubber Ind.*, Dec., 1927, pp. 312-330.

A STUDY OF THE INFLUENCE OF MOISTURE ON RUBBER TESTING.—F. S. Conover and H. A. Depew, Reprint, *Proceedings A. S. T. M.*, Philadelphia, Pa.

THE UTILIZATION OF RUBBER-PLATED APPARATUS IN CHEMICAL INDUSTRY.—A. Bresser, *Korrosion Metallschutz* 3, pp. 229-31 (1927).

FERTILIZING EXPERIMENTS ON HEVEA. II.—J. Grantham, *Archief*. 11, pp. 472-6 (1927).

CHEMISTRY AND TECHNOLOGY IN THE RUBBER INDUSTRY.—Richard Weil, *Gummi-Ztg.* 42, pp. 412-4 (1927).

RUBBER AND ITS FUTURE.—J. Dugué, *Rev. Gén. Caoutchouc*, 1927, No. 35, pp. 11-14.

VULCANIZATION AND DEVULCANIZATION OF RUBBER.—P. Bary, *Rev. Gén. Caoutchouc*, 1927, No. 35, pp. 5-7; No. 36, pp. 3-4.

MODERN ELECTRIFIED RUBBER MILL.—Anon, *Elec. World*, 90, pp. 1081-4 (1927).

COLLOIDAL CHEMISTRY OF RUBBER LATICES. II.—Surface Tension Measurements with Latex of *Hevea brasiliensis*.—E. A. Hauser and P. Scholz, *Kaut*, 1927, pp. 332-333.

COLLOIDAL CHEMISTRY OF RUBBER LATICES. III.—Individual Shapes of the Rubber Particles and Their Heritability.—E. A. Hauser, *Kaut*, 1927, pp. 357-359.

RELATIVE ACTION OF VULCANIZATION ACCELERATORS IN VULCANITE MIXINGS.—R. Dittmar, *Chem. Ztg.*, 1927, 51, pp. 901-2.

PHYSICO-MECHANICAL PROPERTIES OF VULCANIZED RUBBER AT HIGH TEMPERATURES. II.—A. van Rossem and H. Van der Meyden, *Kaut*, 1927, pp. 364-371.

REACTIONS OF ANILINE AND ITS HOMOLOGS IN ACCELERATING VULCANIZATION.—T. Kimishima, *Mem. Coll. Eng. Kyushu*, 1927, 4, pp. 193-250.

SOUTH AFRICAN RUBBER.—E. Neufeld, *Kaut*, 1927, pp. 359-364.

A CONTRIBUTION TO THE ACTION OF EMAREX ON THE PHYSICAL PROPERTIES OF VULCANIZED RUBBER.—L. Stoll, *Gummi-Zeit.*, Dec. 30, 1927, pp. 695-696. Graphs.

A CONTRIBUTION TO THE QUESTION OF THE ALTERATION POINT OF RUBBER AT 60 TO 80 degrees C.—L. Stoll, *Gummi-Zeit.*, Jan. 6, 1928, pp. 745-746.

THE MANUFACTURE OF RUBBERIZED FABRICS.—*Gummi-Zeit.*, Jan. 6, 1928, pp. 747-750, and Jan. 13, 1928, pp. 805-806. Diagrams.

NEW VIEWS ON MINERAL RUBBER AND ITS BEHAVIOR IN THE PRESENCE OF THE ULTRA-ACCELERATOR P-EXTRA.—R. Ditmar, *Gummi-Zeit.* Jan. 13, 1928, p. 804.

CONSIDERABLE REDUCTION IN THE VULCANIZATION PERIOD OF THINWALLED DIPPED GOODS IN SULPHUR CHLORIDE VAPOR.—R. Ditmar and G. Balog, *Gummi-Zeit.*, Jan. 20, 1928, pp. 858-859. Graph.

THE RECOVERY OF VOLATILE SOLVENTS.—H. Molinari, *Giorn. Chim. Ind. Applicata*, Dec., 1927, pp. 571-579. Illustrated.

THE USEFULNESS OF RUBBER PLATED APPARATUS IN THE CHEMICAL INDUSTRY.—A. Bresser, *Kunsttoffe*, Jan., 1928, pp. 1-3. Graph, diagrams, tables.

CRITICAL CONSIDERATION OF THE PREFERRED VULCANIZATION ACCELERATORS.—Werner Esch, *Kunsttoffe*, Dec. 1927, pp. 273-274, and Jan., 1928, pp. 12-13.

FURTHER DATA ON THE TACKINESS OF RUBBER.—G. de Vries and N. Beumee-Nieuwland. *Archief*, Dec., 1927, pp 557-566. Table, English version, pp. 567-572.

FURFUROL; THE HISTORY OF AN INDUSTRIAL RESEARCH.—C. S. Miner, *Can. Chem. & Met.*, Feb., 1928, pp. 46-7.

SYNTHETIC RESINS. A survey.—A. A. Drummond, *I. R. Jour.*, Jan. 21, 1928, pp. 101-103.

THE HEATING OF RUBBER INSULATED WIRES AND CABLES. Results of French tests to establish current densities.—L. B. Desbleds, *I. R. Jour.*, Jan. 28, 1928, pp. 138-9.

MODERN ASPECTS OF RUBBER CULTIVATION.—C. H. Wright, *I. R. Jour.*, Feb. 4, 1928, pp. 179-185. Serial.

THE PROGRESS AND FUTURE OF RUBBER FOOTWEAR.—D. Baptie, *Rubber Age* (London) Feb., 1928, pp. 483-6.

BRITTLENESS TESTS FOR RUBBER AND GUTTA PERCHA COMPOUNDS.—G. T. Kohman and R. L. Peek, Jr., *Ind & Eng. Chem.*, Jan., 1928, pp. 81-3.

Legal Decisions

Customs

HOLLOW RUBBER BALLS. T.D.42,546, George S. Bush & Co., Inc., v. United States, U. S. Customs Court, First Division. Claim that balls are designed for use in physical exercise or in any indoor or outdoor game or sport and are dutiable as such under paragraph 1,402, tariff act of 1922, and not under the more general provision for all other toys in paragraph 1,414.

Protest was sustained and balls held dutiable under paragraph 1,402 at 30 per cent ad valorem.—*Treasury Decisions*, Vol. 53, pp. 5-11.

RAINCOATS. No. 4,858. Protest 182,730-G of L. Bamberger & Co., New York. Raincoats composed of cotton and rubber, classified as wearing apparel in chief value of cotton at 35 per cent ad valorem under paragraph 919, tariff act of 1922, are claimed dutiable as manufactures of rubber at 25 per cent under paragraph 1,439. Opinion by J. Weller. In accordance with stipulation of counsel and on the authority of Abstract 4,044 raincoats in chief value of rubber were held dutiable under paragraph 1,439 as claimed.—*Treasury Decisions*, Vol. 53, p. 27.

Patent Suits

MACHINE. 1,605,445, F. L. Killian machine for manufacturing thin rubber articles, D. C., N. D., Ohio (E. Div.), Doc. 2,213, P. H. Stevens *v.* The J. L. Skunk Rubber Co. Decree holding patent valid as to claims 1, 8, 9, 11, 15, 16, 17, 18, 19, and 20, December 21, 1927.—*Official Gazette*, Vol. 367, p. 6.

Disclaimer

AIRBAG PULLER. 1,535,382, Edward C. Taylor, Longmeadow, and Charles H. Desautels, Springfield, Mass. Patent dated April 28, 1925. Disclaimer filed January 14, 1928, by the assignee, The Fisk Rubber Co.

Hereby enters this disclaimer to that part of the claim in said specification which is in the following words:

"2. In a machine for pulling bags out of tire casings, a device for opening the tire, and a single means for simultaneously separating the tire and bag at the point of opening and thereafter pulling the bag free of the tire."

New Goods and Specialties

Novelty Hot Water Bottle

A hot water bottle which is perfectly efficient and yet may do duty as a hygienic doll is a novelty from Chas. Mac-

Teddy Bear Bag

intosh & Co., Ltd., 2 Cambridge St., Manchester, England. It is molded to the shape of a Teddy Bear, colored and painted to represent the conventional child's toy. It is fitted with a safe, easy stopper, attached by a chain to the bottle, and provides amusement as well as warmth for the baby's carriage or cot.

All Black Tire

Thorobred

Supplementing its line of quality tires, the Dayton Rubber Mfg. Co., Dayton, O., announces that it is now manufacturing an all black Thorobred tire made in standard weights and number of plies. The new tire differs from the Dayton extra ply line in that it is not made with a white sidewall and does not carry the characteristic red stripe. The tread design is the same as the stabilized balloon, made by the same manufacturer, while the high pressure type carries a fine appearing non-skid tread. All sizes in both balloon and regulars are made.

New Swimming Device

The timid swimmer acquires complete confidence when girded with the buoyant bathing belt illustrated. With two-thirds inflation, it fits close to the body and will hold the air from five to ten hours, according to atmospheric conditions and the strain put upon it. It is extremely light, forms no impediment to the bather's absolute freedom, allows the wearer to make short dives, and, a particularly remarkable feature, will not interfere with deep dives. It is made similar to a high grade inner tube, with an outer and inner layer of good rubber cemented to fabric in between.—L. H. Gilmer Co., Tacony, Philadelphia, Pa.

Device for Curling Lashes

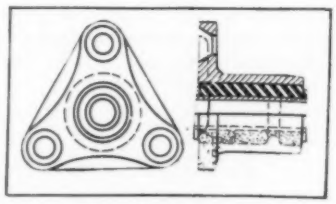
A harmless device for curling eye lashes which requires no heat or cosmetics has recently appeared and found instant favor with the fair sex. Kurlash is placed over the eye, close to the upper eyelid, with the lash between the two curler bows. A firm pressure on the handles, only a few seconds, bends the soft rubber and the lashes around the upper bow, producing a decided curl which, according to the manufacturer,

Kurlash

will last from one to three days. Besides increasing the beauty of the eye, Kurlash stimulates the growth of the lashes by a gentle massaging of the roots during the natural action of curling.—The Kurlash Co., 107 Clinton Ave. North, Rochester, N. Y.

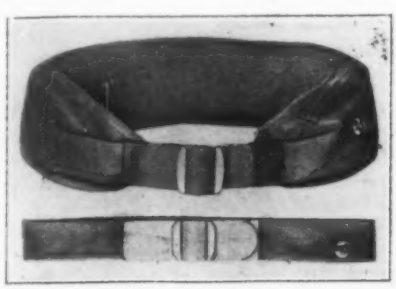
Rubber Motor Mounting

Mounting fixtures of rubber recently developed are applicable not only to automobiles and trucks but to many other types of machinery that are subject to vibration. The front motor mountings are on a three point suspension with two rubber bushings placed vertical one on each side with a bolt running down through into the cross



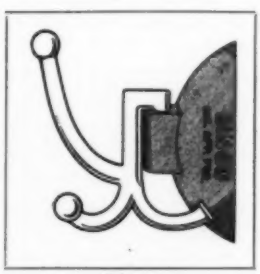
Mounting Fixtures

members. They can be furnished with any size hole to fit different bosses on the motor and will carry a weight up to 2,000 pounds. The rear mounting has two rubber bushings placed in a horizontal frame one above the other and prevents a rocking motion. They may be placed in a housing or between angle iron support. A weight of from 500 to 3,000 pounds may be carried. The rubbers are all forced in under pressure and will last a long time.—Powell Rubber Bushing Co., 320 Catherine St., Utica, N. Y.



Buoyant Belt

Collapsible Coat Hanger



Bingo

The collapsible coat and hat hanger, Bingo, folds up to be carried in vest pocket or ladies' purse. It sticks on any smooth surface. To attach moisten inside of the cup, grasp firmly and release against smooth object. To remove, simply lift one side of vacuum cup allowing air to enter. A variation particularly valuable to the traveling man, is the portable shaving mirror which, like the coat hanger, may be used in the office, automobile, railroad car, etc.—Super Novelty Co., 98 Park Place, New York, N. Y.

Stamp Pad with Rubber Backing

The busy executive will welcome a very practical use for an old inner tube, which will prevent his stamp pad from sliding and jumping all over his desk and never being in the same place twice. Glue the smooth side of the tube next to the tin of the pad, leaving the rough side exposed and in contact with the glass top of the desk, and the pad will remain in the same place no matter how frequently or vigorously it may be used.

Okocord

The Okonite Co., Passaic, N. J., has produced a flexible, tough, unkinkable cord for connection between outlets and all portable electric devices which is proof against water, oil, grease and acids. Protected with a sheath of 60 per cent fine Para compound, this unique cord is as tough as alligator hide and yet snakelike in its flexibility. It is extensively used in repair work, garages, machine shops, factories, etc.

Horseshoe Game

The popular horseshoe game has been made into an indoor sport by the use of rubbered covered shoes which prevent injury to furniture or floor. Two stakes

Rubber Covered Shoes

in round metal bases and four shoes comprise the set. The manufacturer is The Pressed Metal Products Co., 6925 Colfax Rd., Cleveland, O.

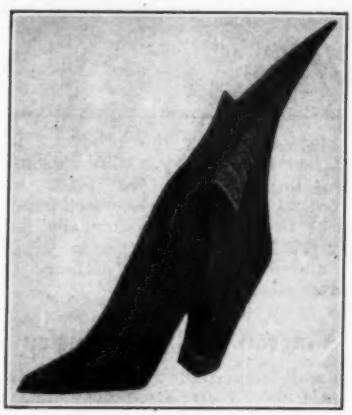
Derby Inner Tube

The Dayton Rubber Mfg. Co., Dayton, O., is now producing, in all popular sizes, a new brown tube of standard weight, to sell at standard prices. The new tube will be known as the Derby.

Garment for Stormy Weather

Arctic Parka

A garment which is suitable for any outdoor wear in stormy weather, such as duck hunting, hiking, mountain climbing, etc., is made of super quality fabric on the outside, with extra strong lining inside, and a rubber processing between, making a laminated fabric of exceptional service, absolutely waterproof. The average length



Gaytees

of the Parka is 37 to 38 inches, and is provided with a comfortable hood to fit the average type hunting cap or hat, with a draw string to close tight around the face, keeping out wind and rain. The front is fastened with automatic metal closing device or double storm fly with snap fasteners. A large pocket in front with flap is convenient for holding shells, field glass, lunch, etc. All seams are sewed, cemented and strapped. The garment is cut in three sizes, small, medium and large.—Chicago Rubber Clothing Co., Racine, Wis.

New Golf Shoe

A golf shoe, named for Walter Hagen who personally cooperated in the design of its last, has been announced by the Witchell-Sheill Co., Detroit, Mich. Its three outstanding features are the receding toe, full roominess of the fore-

Walter Hagen Shoe

part and the smart style lines. It is said that Hagen personally worked out placement and style of spikes, his experience here and abroad on leading golf courses showing him the various needs of a dependable, comfortable golf shoe. Three styles of soles are offered: plain leather, leather with spikes and rubber.

Tailored Overshoe

The very newest in tailored overshoes, the Gaytees, are particularly effective because of their snappy, chic style. The spring suit will lose nothing of its smart effect when the feet are shod in this footwear, and the color may be selected to correspond with that of the garment worn. The manufacturer is the United States Rubber Co., 1790 Broadway, New York, N. Y.

Liberty Bumper

A rubber mounting of the main bar on the back structure is a novel feature of the Liberty bumper. It prevents rattle and distributes the strain from collisions, relieving both car frame and bumper, and will absorb vibration.

The bumper has been developed by the Roger Angstman Co., Detroit, Mich., and will be manufactured by the Liggett Spring & Axle Co., Monongahela, Pa., for original equipment only.

Boat Shaped Swimmer

K. & W. Swimmer

Easily and quickly inflated, the boat-shaped swimmer illustrated does not retard the bather but cuts through the water like a canoe. Equalized air pressure is assured because one valve does duty for the three pontoons. Durable red rubber, vulcanized throughout, forms three perfect air chambers, buoyant enough to sustain the weight of a full grown man. The wide web belt holds the float securely in place, and may be worn either across the chest or strapped snugly on the back at the height of the shoulderblade.—The K. & W. Rubber Co., Delaware, O.

Murray Markets New Tire

A new tire guaranteed for 24,000 miles of service is being marketed by the Murray Rubber Co., Trenton, N. J. It has two more plies of fabric than is found in the ordinary standard tire, the last two plies being of squeegee construction which, it is said, insures the flexibility and freedom of carcass trouble of the four ply with the strength and freedom from shimmying of the six ply. Nothing but selected estate smoked rubber is used with approximately double the ordinary thickness between the plies and tread stock and a tensile strength of over 4,000 pounds per square inch. The tire is expensive to build and the price is high, but the company believes the mileage it is capable of covering will make it cheaper in the long run.

Obituary

Popular Publicity Manager

Harry S. Quine, one of the best known and most popular men in the rubber publicity field, passed away at his home, 205 Shawnee Path, Akron, O., Friday, February 17, 1928. He was fifty-one years of age, and had been in ill health for the past two years, heart disease and complications confining him to the house for two months and finally resulting in his death.

Mr. Quine was for seven years publicity manager of the General Tire & Rubber Co., and had previously acted as secretary to F. A. Seiberling when the latter was president of The Goodyear Tire & Rubber Co., a position he held from 1911 to 1920 when he went to the General.

He was regarded in Akron rubber circles as one of the most brilliant advertising men in the business. He had been, before going to General, writer, editor, public speaker and advertising councilor. His publicity and advertising copy, as well as his spoken statements, were regarded as accurate and conservative and were usually taken at their face value by tire dealers to whom he talked and by editors who received copy from his office at Akron.

Harry S. Quine

He is survived by his widow, his father, R. S. Quine, one brother, C. R. Quine, president of the Akron Equipment Co., and a sister, Bessie Quine.

Inventor and Manufacturer Victim of Heart Attack

The sudden death in Akron, Ohio, of H. M. Lambert, former president of the Lambert Tire & Rubber Co., removes a well-known figure, long prominent in the manufacturing field. He was in his seventieth year and his death, which occurred in the City Club February 4, was the result of a heart attack.

Mr. Lambert was the inventor of a special form of cushion tire and he founded the Lambert Tire & Rubber Co. to manufacture this product. The first factory was located in Portland, Ore., but in 1918 the plant was moved to Ohio. Mr. Lambert continued at the head of the company until May, 1927, when J. W. Coyle, George W. and J. P. Seiberling assumed the management of its affairs.

Veteran of Tire Industry

A well-known figure in the tire industry, Otis R. Cook, passed away January 20 at the age of 52. A former official of The Goodrich, Kelly-Springfield and Howe rubber companies, Mr. Cook had retired from active participation in business in 1924.

Otis R. Cook

Born in Cleveland, O., October 16, 1875, he received his education in the public and high schools of that city, making his first business connection in 1893 when he joined The B. F. Goodrich Co. The same year he left to join the U. S. Express Co., returning to the Goodrich organization in 1895 and remaining with that company until 1905. He then became special representative for the Firestone Tire & Rubber Co. until 1911 when he became local branch manager at Cleveland for the Kelly-Springfield Tire Co., afterwards being made general sales manager and a director. Following this affiliation, he was vice president and general manager of the Howe Rubber Co., a position he retained until his retirement in 1924.

Besides being a salesman of unusual ability, Mr. Cook was a natural leader who inspired confidence in all with whom he came in contact. His resourcefulness and ability were amply demonstrated in the splendid sales organizations he built up, and his success was a result of hard work and serious application.

Mr. Cook was a 32nd degree Scottish Rite Mason, a Shriner, Knight Templar and a member of the Shaker Heights Country and Cleveland Athletic Clubs.

Founder of Cotton Mill Group

Fuller E. Callaway, Sr., founder of the Callaway group of cotton mills, died on February 12 at his home in La Grange, Ga.

Mr. Callaway was born in La Grange fifty-seven years ago, and at the age of eighteen began his career in the business world by opening a five and ten cent store. The venture flourished from the start, growing into a department store and eventually developing into a wholesale dry goods concern. In 1900 he became a cotton manufacturer, establishing a chain of mills which year by year was increased in size and power by him.

Fuller E. Callaway

He was a powerful figure in the industrial life of the country and an outstanding leader in the South. In 1919, Mr. Callaway was made chairman of the first commission ever sent from this country to study textile conditions and methods in Europe, and the same year was appointed by President Wilson as representative of the public at the conference of industrial relations in Washington. By a vote of Southern mill officials, Mr. Callaway was named, in 1921, one of the seven leaders of the southern textile industry.

Mr. Callaway is survived by his widow and two sons, Cason J. and Fuller E. Callaway, Jr.

Edward M. Kelly

Edward M. Kelly, head of E. M. Kelly, Inc., Buffalo, N. Y., advertising agency, died recently in that city, aged 28. Before starting his own advertising agency in 1922, he had been advertising manager of The Hewitt Rubber Co. of Buffalo.

Father of D. B. Webster

Charles B. Webster, father of Donald B. Webster, treasurer of the Clifton Mfg. Co., Jamaica Plain, Mass., manufacturer of rubber clothing, died recently while on a vacation in Bermuda. Funeral services and burial were held in Malden, Mass. Mr. Webster was a publisher and head of the firm of C. B. Webster & Co.

Financial and Corporate News

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven Hose & Rubber Co.	Com.	$1.50 q.	Mar. 15	Mar. 1
Goodrich, The B. F., Co.	Com.	$1.00 q.	Mar. 1	Feb. 10
Goodrich, The B. F., Co.	Pfd.	$1.75 q.	Apr. 2	Mar. 9
Goodrich, The B. F., Co.	Pfd.	$1.75 q.	July 2	June 8
Hood Rubber Products Co.	Com.	$0.87½ q.	Mar. 1	Feb. 15
Hood Rubber Products Co.	Pfd.	$1.75 q.	Mar. 1	Feb. 20

New York Stock Exchange Quotations

February 23, 1928

Company	High	Low	Last
Ajax Rubber, com.	10½	10¼	10⅜
Fisk Rubber, com.	15⅛	15	15
Goodrich, B. F., Co., com. (4)	83⅞	81⅛	81½
Goodyear Tire & Rubber, com.	60	58½	58½
Goodyear Tire & Rubber, 1st pfd. (7)	98¼	98½	98½
Intercontinental Rubber (1)	15½	14⅜	14⅞
Kelly Springfield Tire, com.	17½	17⅛	17¼
Kelly Springfield Tire, 6% pfd.	64	64	64
Lee Rubber & Tire, com.	19	18¼	18¼
Miller Rubber, com.	21	21	21
United States Rubber, com.	51¼	47¾	48⅜
United States Rubber, 1st pfd. (8)	100⅜	98¼	98¾

Akron Rubber Stock Quotations

February 23, 1928

Company	Bid	Asked
Akron Rubber Reclaim.	21	24
Akron Rubber Reclaim, pfd.	97	100
Falls	5	10
Faultless	37	38
Firestone	185	191
Firestone 6% pfd.	109	...
Firestone 7% pfd.	108½	109
General	180	185
General 6% pfd.	100½	103
Goodrich	83¾	84¼
Goodrich pfd.	109⅜	110
Goodrich, 6½%	107½	108½
Goodyear	59¾	60⅜
Goodyear 1st pfd.	98	99
Goodyear 5s 28	100⅜	100¾
Goodyear 5s 57	94¾	95
Goodyear 5½s 31	100½	101
India, com.	18	22¼
India 7% pfd.	85	...
Mason	1	1½
Mason pfd.	11	15
Miller	20	22
Miller 8% pfd.	90	92
Mohawk	...	38
Mohawk 7% pfd.	70	80
Rubber Serv. Lab.	...	47
Seiberling	35	37
Seiberling 8% pfd.	102½	104
Star	1	...

Goodyear Tire & Rubber Co.

For the year ended December 31, 1927, unit sales of tires showed an increase of more than 15 per cent over 1926. Consolidated net sales were $222,178,540. Notwithstanding the 15 per cent increase in number of tires sold, value of sales was about 3.5 per cent less than in 1926, reflecting the substantially lower selling prices which prevailed during the past year.

Total net profits credited to surplus were $13,135,666 after deducting the following: $9,298,648 depreciation of plants and equipment; taxes, interest, premium and discount; $3,500,000 reserve for commitments and contingencies; and profits of subsidiary companies applicable to stock not held by the company.

The consolidated surplus at the close of the year amounted to $25,589,105, after paying dividends of $5,645,379, deducting charges incident to refinancing and extraordinary legal and other expenses amounting to $9,606,195, and reserving $3,000,000 for loss on liquidation of subsidiary properties. The ratio of current assets to current liabilities as shown by the consolidated balance sheet is 7.3 to 1.

General Tire & Rubber Co.

Stockholders of the General Tire & Rubber Co. voted to retire $1,420,000 7 per cent preferred at $112 and to reissue $3,500,000 of an authorized $10,000,000 new preferred at 6 per cent, selling at $102. It was brought out that the average net earnings for the past 5 years were $1,417,992 or seven times the dividend requirements on the preferred stock to be presently outstanding. The earnings for 1927 were eleven times such requirements. The preferred stock is followed by 81,500 shares of outstanding common stock having no value at present in excess of $15,000,000.

The company's balance sheet shows net tangible assets at approximately $300 per share on the preferred and net quick assets of about $240 per share. It also shows the current assets to be about seven times the current liabilities. Sales this year were a little less than $24,000,000, meaning that the plant turned out its value in sales every two weeks, and net earnings, after depreciation and federal taxes, were $2,233,778.60.

The B. F. Goodrich Co.

Net sales of The B. F. Goodrich Co. for the fiscal year ended December 31, 1927, were in excess of $151,000,000, the largest in the history of the company. The net income for the year after adequate depreciation on properties, provision for federal income taxes and a contingency reserve of $1,000,000 was approximately $11,700,000.

Current assets as of December 31, 1927 were approximately $71,000,000 and current liabilities were approximately $12,200,000. Five million dollars of the $15,000,000 5 per cent serial notes outstanding January 1, 1927, were retired January 15, 1927, and a second $5,000,000 of these notes due January 15, 1928, have been paid, leaving now outstanding $5,000,000.

Dividends on the preferred stock were declared as follows: $1.75 per share payable April 2, 1928, to stock of record at the close of business March 9, 1928, and $1.75 per share payable July 2, 1928, to stock of record June 8, 1928. A dividend of $1.00 per share was also declared on all common stock without nominal or par value, issued and outstanding February 10, 1928, payable March 1, 1928, to stock of record February 10, 1928.

The directors also approved the retirement of 11,880 shares of preferred stock in accordance with the provisions of the charter. Joseph R. Swan, president of the Guaranty Co. of New York was elected to the board.

Hood Rubber Co.

Preliminary figures for the nine months ended Dec. 31, 1927, indicate a balance of approximately $3 a share for the period after all charges and preferred dividends, upon the 200,000 shares of common stock. This compares very favorably with a loss in the March 31, 1927, fiscal year of $2,478,000. Last year was abnormal, of course, for the total shrinkage in values incidental to declining raw materials, falling finished goods prices and rebates, was in the neighborhood of $4,000,000.

The Watertown company did a record-breaking unit volume of sales, the total for the nine-month period being $28,667,000 as compared with $40,049,000, for the entire 1927 fiscal year. Despite the fact that selling prices averaged 20 per cent below last year, unit sales were 17 per cent larger than the same period of 1926. Total net earnings for the nine months' period were something in excess of $1,000,000, after interest, taxes, and after deducting $416,000 of preferred dividends the balance for the common was approximately $600,000.

The financial position at the end of the year was sound. Borrowings were cut from $3,925,000 to about $3,250,000, and inventories reduced from just under $12,000,000 to about $10,500,000. Due to sinking fund payment on notes and preferred stock, working capital increased slightly to $18,500,000. Surplus gained about $400,000 to $3,850,000.

As a result of the installation of labor saving equipment and improved operating methods, Hood's efficiency has been constantly

gaining. For instance it did in all 1927 about four times as much business as in 1920 or roughly $36,000,000 against $9,000,000 with only a 50 per cent addition in factory employes from 5,000 to 7,500. The Hood company has a present daily capacity of 75,000 pairs footwear, 3,650 tires pneumatic and solid, 45,000 pairs rubber heels and 10,000 pairs rubber soles daily.

The Falls Rubber Co.

The net earnings of The Falls Rubber Co., Akron, O., for the past year were $82,858, which is equivalent to $2.60 per share on the no par common stock after allowance for preferred requirements. Current assets were shown as $629,294 and current liabilities $248,539. The book value of common stock is computed at $35 per share. During the year unit sales increased over 40 per cent. The company has no bonded indebtedness or bank obligations.

Marathon Rubber Products, Inc.

At the annual stockholders' meeting of the Marathon Rubber Products, Inc., Wausau, Wis., held on February 6, the directors declared the usual dividend of 10 per cent, and, after deducting dividend and all known liabilities, including federal and state income taxes and depreciations, a balance of $42,270.20 was transferred to surplus account. A. Burnett is secretary and general manager.

New Incorporations

BALLOON TIE CORP., January 9 (New York), $5,000. T. Rochman, 1774 Townsend Ave.; T. Fruchtman, 903 Whitlock Ave.; A. Applebaum, 315 Rivington St., all of New York, N. Y. Principal office, Manhattan. To manufacture balloon ties.

CUT RATE TIRE CO., INC., February 7 (New York), $20,000. H. Silver and C. Greenberg, both of 309 West 50th St., New York; S. Gordon, 184 Beach 77th St., Arverne, both in New York. Principal office, Kings County, N. Y. Tires.

KLEIN & KADINSKY RAINCOAT CO., INC., February 2 (New York), $10,000. S. Kadinsky, 19 E. 107th St., New York; M. Klein, 3066 E. 7th St., I. Kroshinsky, 3126 Coney Island, both of Brooklyn, both in N. Y. Principal office, Manhattan. To manufacture rubber raincoats.

MEDICAL RUBBER SPECIALTY CO., December 16, 1927 (Delaware), capital stock 7,500 shares preferred, $10 par value and 2,500 shares common, $10 par value. F. A. Burns; W. Moorhead; F. M. Yokom, all of Detroit, Mich. Delaware agent, F. Mettler, 832 Market St., Wilmington, Del. To deal in all kinds of rubber.

MICHIGAN RUBBER CORP., January 25 (Delaware), capital stock 2,000 shares preferred, $100 par value and 1,500 shares common, no par value. E. M. Hill, R. E. Wright, J. E. Wells, all of Grand Rapids, Mich. Principal office, with the Colonial Charter Co., 927 Market St., Wilmington, Del. To deal in rubber specialties.

MOLEVY TIRE RELINER & PATCH CO., INC., February 20 (New York), $10,000. A. Levy, 2343 First Ave.; M. Sussman, 2432 First Ave.; M. Ingber, 41 Maiden Lane, all of New York City. Principal office, Manhattan. To manufacture tires, patches, reliners, etc.

THOMAS TIRE CO., INC., February 7 (New York), $20,000. H. Silver and C. Greenberg, both of 309 West 50th St., New York and S. Gordon, 184 Beach 77th St., Arverne, both in N. Y. Principal office, Kings County. Tires.

UNION TIRE & SUPPLY CO., INC., February 2 (New York), $10,000. D. Rosenbloom, 28 Overdale Park; M. Marine, 31 Laburnan Cres.; S. Bernstein, 314 Union Trust Bldg., all of Rochester, N. Y. Principal office, Rochester, N. Y. Tires.

UNITED STATES SOFT TILE CO., INC., January 24 (New York), $20,000. J. R. Costanza, Palisade Park, N. J.; H. Leventhal, 2334 Ocean Ave. and M. Leventhal, 1510 Ocean Parkway, both of Brooklyn, N. Y. Principal office, Brooklyn, N. Y. Rubber flooring.

WEAR WELL SLIPPER CO., INC., January 26 (New Jersey), capital stock 100 shares no par value. G. H. Hubbard; M. F. Wilson, H. Kunkel, Jr., all of 15 Exchange Place, Jersey City, N. J. Principal office, 15 Exchange Place, Jersey City, N. J. To manufacture rubber boots, shoes, etc.

WENDOVER TIRE SERVICE, INC., February 10 (New York), $20,000. A. L. and E. K. Wendover, 623 Hanover Place, Mt. Vernon; F. E. Haag, 20 Benedict Place, Pelham, both in N. Y. Principal office, Mt. Vernon, N. Y. Tires.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

NUMBER	INQUIRY
1068	Source of supply for toy balloons, etc.
1069	Manufacturer of Rub-Riz.
1070	Manufacturer of Thionex and Aluminum flake.
1071	Makers of rubber novelties.
1072	Firms making white friction tape.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House New York, N. Y.

NUMBER	COMMODITY	CITY AND COUNTRY	PURCHASE OR AGENCY
29,126	Toys, balls and balloons..	London, England....	Agency
29,130	Sheet rubber for shoe soles.	Pirmasens, Germany.	Agency
29,162	Druggists' sundries.....	Basrah, Iraq.....	Either
29,168	Rubber proofed clothing..	Rome, Italy.....	Purchase
29,196	Hip and knee boots.....	Bordeaux, France...	Purchase
29,197	Rubberized drill material for making baths.....	Antwerp, Belgium...	Purchase
29,198	Automobile and truck tires	Caracas, Venezuela..	Agency
29,199	Rubber soled tennis shoes.	Monterey, Mexico...	Agency
29,200	Industrial rubber goods..	Santiago, Chile.....	Agency
29,257	Truck tires.....	Bilbao, Spain	Purchase
29,258	Tires	Copenhagen, Denmark	Agency
29,307	Surgical rubber goods....	Bologna, Italy.....	Purchase
29,322	Tires	Nairobi, Kenya Colony, Africa.....	Agency
29,325	Automobile and bicycle tires	Lwow, Poland.....	Agency
29,392	Druggists' sundries.....	Johannesburg, South Africa	Agency
29,428	Tires and tubes.....	Madras, India.....	Either
29,439	Dental rubber supplies...	Seoul, Japan.....	Agency
29,454	Rubber bands.....	Bernares, India.....	Both
29,479	Rubber hand stamps.....	Frankfort, Germany..	Purchase
29,486	Rubber hand stamps.....	Leeds, England.....	Purchase
29,514	Rubber belting.....	Sao Paulo, Brazil...	Agency
29,553	Inner red scrap tires....	Salamanca, Spain....	Purchase
29,554	Tennis shoes.....	Munich, Germany....	Both
29,555	Tires	Berlin, Germany.....	Both
29,556	Rubber tire boots.....	Prague, Czechoslovakia	Agency
29,557	Solid tires.....	Almeria, Spain.....	Agency
29,558	Overshoes and sport shoes.	Oslo, Norway.....	Agency
29,559	Bathing caps and shoes..	Vienna, Austria.....	Agency
29,595	Bathing caps and shoes..	Stockholm, Sweden..	Agency
29,615	Tires	Erfurt, Germany....	Agency
29,621	Tires	Smyrna, Turkey.....	Purchase

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

NUMBER	SPECIAL CIRCULARS
1778....	Canadian Imports 1924-1925 and 1926.
1790....	United Kingdom Imports 1925-1926.
1791....	Czechoslovak Imports 1925 and 1926.
1794....	Norwegian Imports 1925 and 1926.
1795....	Australian Imports 1925 and 1926.
1797....	Rubber Footwear Exports.
1817....	United Kingdom Crude Rubber Consumption 1927.
1819....	Canadian Exports Belting and Hose, Calendar Year 1927.
1823....	Mechanical Rubber Goods Exports.
1826....	British Exports of Casings During December and 1927.
1836....	Sundries and Toys in Southwest England.
1838....	Exports of Boots and Shoes from United States, Canada and United Kingdom, Calendar Year 1927.

AUTOMOBILE REGISTRATION DURING 1927 TOTALED 23,125,000 CARS and trucks, according to figures compiled by the National Automobile Chamber of Commerce. Comparison of this registration with the number of miles of surfaced highways shows that there are 40.2 motor vehicles in the United States for every mile of surfaced road.

AN INTERESTING DECISION HAS JUST BEEN MADE BY THE U. S. Board of Tax Appeals which allows a deduction from gross income, in the computation of income taxes, of any loss sustained in accidental damage to an automobile, even though it be used for pleasure purposes.

The Rubber Industry in America

Ohio

Practically all Ohio rubber factories are operating close to capacity, with sales running from 10 to 15 per cent greater than was the case at this time last year. Indications are that new high production records will be reached during March.

In the Akron district more than 150,000 automobile casings and 160,000 inner tubes a day are being manufactured. Demand from car manufacturers for tires for original equipment has been heavy and sales to dealers on spring dating basis has surpassed all previous marks.

The comparatively mild winter, with a smaller snowfall than last year, has caused a slight falling off in sales of rubber footwear. The footwear department at The B. F. Goodrich Co. plant has been slowing down and a number of employes in that work were either transferred to other departments or laid off.

The recent sharp drop in the crude rubber market will result in considerable loss in inventories for the larger companies especially, unless present prices of finished products can be maintained until inventory positions are adjusted. Most authorities do not look for a continuation of the decline in crude rubber.

Goodyear Tire & Rubber Co. reached a new peak of 56,000 tires a day at the Akron plant during the latter part of February. Close to 70,000 casings daily are being turned out by the combined plants, including foreign subsidiaries, While no official report has been issued, it is estimated that sales for 1927 were about $228,000,000, slightly below the total of $230,161,357 reported in 1926. Estimated earnings of $15,000,000 would be equal to about $12 a share on the common stock.

The B. F. Goodrich Co. is getting more tire business this year than ever before, and all plants are running close to capacity. The aggressive sales policy pursued in recent months by the new management under the direction of President Harry Hough has shown gratifying results. Daily tire output at Akron is around 40,000 casings.

Akron Rubber Reclaiming Co., Barberton, O., reports net income of $126,021 for 1927. Sales were $1,250,511, a gain of 14 per cent over 1926. During the year the common stock was placed on a $1 per share dividend basis.

W. E. McCormish and **W. W. Wildman,** both prominent in the rubber industry for many years, have taken over the management of the Grubb Rubber Co., Akron, O.

The French Oil Mill Machinery Co., Piqua, O., has appointed Glenn H. Seely, 572 South High St., Akron, as the representative of the company in the northeastern part of Ohio.

Harvey S. Firestone, president of the Firestone Tire & Rubber Co., announces that the Firestone tire plants in Akron and Canada are operating almost full time, with three eight hour shifts employed. Demands of the Ford Motor Co. have taxed the capacity of the No. 2 plant, in Akron, which specializes in the manufacture of small size casings.

India Tire & Rubber Co. sales for 1927 showed an increase of 15 per cent in dollar volume over 1926 sales. Bank loans have been reduced from $1,200,000 at Dec. 31, 1926, to $575,000 at the close of 1927. Working capital ratio has likewise been improved. The outlook for the coming months is particularly bright, it is stated.

L. J. Schott, president of the Northern Rubber Co., Akron O., reports that sales were doubled in 1927 compared with the previous year. Current assets are twice current liabilities.

Miller Rubber Co., Akron, O., which experienced a loss in earnings last year, is progressing nicely, it is reported. L. C. Rockhill, the new sales manager, has greatly increased the company dealer business and the outlook for 1928 is excellent.

Personnel Changes in the Faultless Rubber Co.

C. D. Hubler has been made president-treasurer of The Faultless Rubber Co., Ashland, O., replacing J. C. Lawrence, who has been appointed assistant to the president of the University of Minnesota. Mr. Hubler has been connected with the Faultless company for some twenty years, serving successively as secretary, treasurer and vice president. George Meiler is the new secretary and L. S. Kendall has been made advertising manager.

Firestone Representative in Africa

T. K. Miller, of the export department of the Firestone Tire & Rubber Co., Akron, O., sailed from New York, January 10, for the west coast of Africa, where he will represent the company. His itinerary includes the Azores, Canary Islands, Senegal, Sierra Leone, Liberia, Ivory Coast, Gold Coast and other places in Africa.

The Dayton Rubber Mfg. Co., Dayton, O., according to John A. MacMillan, president and general manager, has increased its manufacturing facilities to a point that will enable it to produce $15,000,000 worth of tires and fan belts a year, an increase in production capacity of some $5,000,000. Four large new 60-inch mills, one three roll calender, electric motors and other equipment have been installed at a cost of $100,000.

W. D. Shilts, secretary of the Goodyear Tire & Rubber Co., Akron, O., has been elected to the board of trustees of Western Reserve Academy, which also counts among its members Frank A. Seiberling, president of the Seiberling Rubber Co. The academy is a school for boys located at Hudson, O.

The Hankins Rubber Co. purchased the plant of the Trolley Supply Co., Massillon, O., and will manufacture surgeons' gloves and other sundries. S. B. Hankins, former vice president of the Massillon Rubber Co., is one of the incorporators.

Mark L. Felber has resigned as head of the dealers' advertising department of the Firestone Tire & Rubber Co., Akron, O. G. Bert Foster will be temporarily in charge.

White & Co. have moved their offices from the Flatiron Bldg. to the Akron Savings & Loan Bldg., Akron, O.

The Miller Rubber Co., Akron, O., announces that L. C. Rockhill has joined the company as its general sales manager and will have associated with him W. C. Behoteguy, G. E. Brunner, G. S. Earseman and F. W. Lohman. F. C. Milhoff remains with the company.

The Oak Rubber Co., Ravenna, O., is represented in Sydney, Australia, by C. R. Strange, who has been connected with the company for more than seven years. Mr. Strange spent considerable time at the plant some time ago.

The Falls Rubber Co., Akron, O., at its annual meeting elected the following officers and directors: G. D. Kratz, president; W. P. Cline, vice president and treasurer; F. H. Comey, vice president and secretary; J. N. Hahn; A. J. Randt; J. B. Firestone; R. P. Bremer; R. I. Philhower; J. O. King, the former president.

S. S. Miller, president of the Mohawk Rubber Co., Akron, O., announces that net profits of the company for 1927 were $631,170.70, against a deficit of approximately $350,000 for 1926. The company has made a strong comeback, after absorbing a heavy inventory loss on crude rubber in 1926. Sales were $5,702,372 for 1927. Current assets at the end of last year were $2,064,227, against current liabilities of $1,264,005. Net earnings amounted to about $23 a share on the common stock.

Urging Pacific General Plant

General Tire & Rubber Co., Akron, O., is being strongly urged by various civic and commercial bodies in Pacific cities to build a branch plant on the Pacific Coast; but, further than intimating that all offers will be carefully considered, the company has given no hint as to whether or not it will follow the course taken by Goodyear, Goodrich, and Firestone, or where it would place such a plant, if decided upon. The impression prevails in trade circles that a southwest location would be favored, and that the plant would be one of considerable magnitude.

For the first time the company last month held general sales conferences on the Pacific Coast, the initial one at the Olympic Hotel, Seattle, under the direction of Branch Manager Tom Cramer on Feb. 6 and 7; the next at the Palace Hotel under the management of Pacific Coast District Manager Dan A. Kimball on Feb. 13 and 14; and the third at the Biltmore Hotel, Los Angeles, on Feb. 20 and 21, arrangements for which had been made by Branch Manager C. E. Criss. President W. O'Neil attended the latter two sessions. L. C. Wesley, formerly of the General Petroleum Corp. has been put in charge of General's national account cushion tire sales at the San Francisco office.

Executive Changes in Lambert Company

J. W. Dessecker has been promoted to the position of secretary and assistant treasurer of the Lambert Tire & Rubber Co., Akron, O., and was also made a member of the board of directors. Mr. Dessecker had been connected with the Star Rubber Co., prior to his joining the Lambert organization about a year ago. J. P. Seiberling was made vice president in charge of sales and continues a member of the board.

Reference Service

A new reference service, designed to minimize for technologists the labor and expense in keeping up with technical progress, is announced by Julian F. and Irene F. Smith, 138 Bachtel Ave., Akron, O.

The rubber industry will be particularly interested in this service, in view of the Akron location and of Dr. Smith's experience as technical librarian of The B. F. Goodrich Co.

Kansas City Branch For General Company

The General Tire & Rubber Co., Akron, O., has just completed purchase of ground, and started plans for a modern office and warehouse building at Kansas City, Mo. The cost of the site and building will be about $200,000.

The ground floor of the new building will be occupied by the Corrigan Tire Co., distributers, and the second and third floors will house the offices and warerooms of the General company.

New President of Falls Company

At a recent meeting of The Falls Rubber Co., George D. Kratz was elected president to succeed J. O. King, the retiring president who remains, however, one of the directors of the company.

The name of G. D. Kratz is recognized among American rubber chemists as that of one of the leading rubber research

G. D. Kratz

chemists in the United States. His ability and earnest work have placed him in the front ranks of his profession, and his unassuming and pleasing manner has made him many loyal friends who are glad to hear of his success.

Mr. Kratz's connection with the rubber industry began after his graduation from Cornell University in 1912 when he received the degree of Bachelor of Chemistry. He then became a member of the Diamond Rubber Co., in his native city of Akron, O., and when that company was absorbed by The B. F. Goodrich Co. remained with the organization as one of the laboratory staff. In 1914 he joined the Norwalk Tire & Rubber Co., Norwalk, Conn., as chemist, three years later assuming the duties of chief chemist for the Falls company, the organization of which he has now been made chief executive.

He has been a frequent contributor to the INDIA RUBBER WORLD, his articles on chemical research being widely read and regarded as authoritative by his contemporaries. In his research work, Mr. Kratz has been closely associated with Dr. David Spence with whom he has collaborated and published many papers which have appeared in various technical publications.

Mr. Kratz is a member of the American Chemical Society, The New Jersey Chemical Society, the University Club of Akron, and the Cornell University Club, New York City.

TEXAS STANDARDIZES HOSE COUPLINGS

Hydrant and hose coupling threads are being standardized in Texas to conform to the national standard. Sixteen towns are now equipped with standard hose threads, according to the Texas Board of Insurance Commissioners.

Great Dirigible Plant

Three cities, Cleveland, O., and Los Angeles and San Diego, Calif., are bidding for the projected $3,000,000 Goodyear-Zeppelin dirigible manufacturing plant and incidentally for world renown as a great center of aircraft industry. The recent conference of President Paul W. Litchfield of the Goodyear Tire & Rubber Co., and Vice President Karl Arnstein of the Goodyear-Zeppelin Co., both of Akron, with officials of the city and Chamber of Commerce of Los Angeles has raised the hopes of the people of the southwest metropolis that they will get the coveted industrial prize. Already strong influence has suddenly quieted a sharp contest among many rival interests over the selection of a municipal airport for heavier-than-air flying craft and efforts are being concentrated on getting an airport that would also serve for giant lighter-than-air vessels. Two necessary conditions for the latter would be a level space of a mile by a mile and a half and the presence of fairly constant one-way air currents that would aid the great rubberized gas-filled ships in their exit from a hangar.

The city council and the commercial body have appointed committees to cooperate with the Goodyear-Zeppelin interests and the latter is having aeronautical engineers make a topographical survey and a study of climatic conditions for forty years in order to get essential data. Location tests will take three months. Stress has been laid by Cleveland people on the technical advantages which their city can offer and on its nearness to Akron, while Los Angeles residents urge climatic, labor, and shipping conditions, coupled with proximity to the California Goodyear plant, as favorable factors in determining the choice of a site in the Southwest. San Diego also has favorable climatic conditions, and it emphasizes the government's great aircraft activities in the city. On the site to be chosen a construction hangar will be erected about 1,200 feet long by about 200 feet high and 332 feet wide, and capable of housing a 6,500,000 cubic foot airship, two of which types will soon be required by the government. Work will be given some 2,000 men.

President Litchfield of the Goodyear company is confident that the bulk of the long-distance air travel, especially trans-oceanic aerial transportation, will be done by lighter-than-air craft, and chiefly because of the latter's safety and carrying capacity. The Akron plant, he says, is virtually the only plant in the United States making such craft and has produced about 150 during the past few years for the government.

TWO MILLION MOTOR VEHICLES WERE placed on the scrap heap last year, and of this number one in every four was involved in an accident resulting in a fatal or othe personal injury. Such statistics show the need of caution and care on the part of t' driver, and carries with it a warning to pedestrians to "watch your step."

Akron Rubber Division A. C. S.

More than 300 chemists and engineers attended the first meeting of the Akron group of the Rubber Division of the American Chemical Society held on February 15 at the Akron City Club. Dr. G. F. Lamb, professor of geology of Mt. Union College, Alliance, O., spoke on the distribution and seasonal fluctuation of Akron's water supply, both surface and underground. He discussed the geological strata underlying the city and vicinity, tracing the formation of the bed rock and upper strata prior to the glacial period and changes that occurred during that period. The further extension of Akron's municipal supply in the Cuyahoga River Valley by a series of dams was suggested as a practical solution of the future demands of the city. The problems confronting the various rubber factories in Akron were pointed out as affected by the conformation of the strata which may be tapped by wells, etc.

Mr. Jennings of the Firestone engineering department opened the formal discussion by local factory engineers and traced the work of the Firestone company in developing deep well water supply of suitable temperature.

Arthur Lewis discussed the development of milling equipment in utilizing the refrigeration effect of the colder water now necessary for modern factory practice. P. S. Shoaff of the Goodyear company spoke of the costs of refrigeration and the further development of the use of deep well water. These discussions will be prepared for publication by the Rubber Division.

Officers elected were: Chairman, Dr. H. A. Winklemann, chief chemist of the Philadelphia Rubber Works Co.; vice chairman, W. H. Fleming, Goodyear Tire & Rubber Co.; secretary and treasurer, R. J. Bonstein, Seiberling Rubber Co.

GARMENT MAKERS DISCOURAGE PROOFERS

One of the worst enemies of the rubber-proofing trade, some of its leaders say, is the average garment manufacturer, who does not want the best quality of goods but the cheapest. The result is said to be a marked loss of confidence on the part of the public, the turning of the latter to flimsier and less durable waterproof clothing, and the removal of an incentive to proofers to improve methods and materials.

RADIO HOUR FOR FISK

Every Monday evening at 10:30 the "Fisk Time-To-Retire Boys" will have an amusement hour over the radio. They will be assisted by a twelve-piece orchestra and will render a jazz program for the delectation of the listening audience.

TIRE IMPORTS TO NEW ZEALAND FROM the United States for 1927 declined in favor of imports from Canada and the United Kingdom.

New Jersey

Production in New Jersey rubber factories is showing improvement in all lines and the manufacturers are encouraged over the outlook. All mechanical goods plants report increased orders for the spring trade, while tire manufacturers say that there is a better demand for all sizes of cord and balloon tires. The fact that prices of tires are lower than they have been in several years is expected to stimulate the tire business. Manufacturers also claim that the merchandise is far better than ever. But little improvement is shown in the hard rubber line.

The Thermoid Rubber Co., Trenton, N. J., reports that business has shown a steady improvement since the beginning of the year and that the various branches of the concern are sending in more orders for goods.

Bruce Bedford, president of the Luzerne Rubber Co., has been elected president of the Manufacturers' Council of the Trenton Chamber of Commerce. **Clifford H. Oakley, president of the** Essex Rubber Co., and John A. Lambert, treasurer of the Acme Rubber Co., are members of the same council.

The New Jersey Tire Dealers' Association was recently chartered at Trenton, N. J., with $100,000 capital to conduct an organization of tire dealers. Samuel Bernhardt, of Newark, is president of the concern.

Horace B. Tobin and Bruce Bedford, prominent Trenton rubber manufacturers, accompanied by their families, have returned from a trip to Canada.

The Pocono Rubber Cloth Co., Trenton, N. J., has experienced a very good year and production was not below normal during the past twelve months. The company is operating two plants in Trenton.

The Near-Para Rubber Co., Trenton, N. J., manufacturer of reclaimed rubber, is now operating to capacity.

Henry N. Young and A. H. Massey, vice president and general sales manager, respectively, of the Combination Rubber Co., Trenton, N. J., have returned from a business trip through the South and West as far as the Pacific Coast. They announce that some good contracts were closed and that the outlook for the coming season is very promising.

The Hamilton Rubber Mfg. Co., Trenton, N. J., reports that production is very satisfactory for this time of the year.

The Pierce Roberts Rubber Co., Trenton, N. J., states that business is picking up with production on the increase in the different departments.

The Murray Rubber Co., Trenton, N. J., is optimistic over the coming year. C. Edward Murray, Jr., president of the concern, spent several weeks traveling through the southern states, while Albert J. Dornseif, general sales manager looked after business interests in the western states.

The Joseph Stokes Rubber Co., Trenton, N. J., reports that business is beginning to show improvement.

The Luzerne Rubber Co., Trenton, N. J., announces that business is not up to normal but expects improvement in the spring.

The Puritan Rubber Mfg. Co., Trenton, N. J., has let a contract for new manufacturing building to cost $10,400.

Whitehead Bros.' Rubber Co., Trenton, N. J., announces that all departments are very busy and that they have enough orders to keep running to capacity for some time. William A. Howell, superintendent has resumed his position after having been ill for the past three months. Mr. Howell has been connected with the Whitehead concern for many years.

The New Jersey Rubber Co., Lambertville, N. J., is operating night and day to keep up with orders for reclaimed rubber.

The Lambertville Rubber Co., Lambertville, N. J., closed its plant February 1, and all manufacturing activities will be confined to the company's plant at Middletown, Conn. Such part of the Lambertville equipment as can be used in Middletown will be transferred there. The Lambertville company has been engaged in the manufacture of rubber boots and shoes since 1875. The company will maintain a distributing branch in Lambertville. Snag Proof rubber footwear will be manufactured in the Middletown plant and shipped to Lambertville for distribution to the trade in the eastern states.

The Manhattan Rubber Mfg. Co., Passaic, N. J., held its annual meeting of directors and stockholders on February 16, and elected John H. Merrell vice president, and made A. S. Hardy, of the export department, a director. Mr. Merrell was formerly general manager of the Chicago branch.

Wishnick-Tumpeer, Inc., announces the opening of a Trenton office under the supervision of R. F. McGrory, well known in the rubber industry for many years. Mr. McGrory will act as manager and will retain his other business connections as in the past.

The Gates Rubber Co., Denver, Colo., has moved its branch warehouse from Jersey City to the Hoboken Terminal Bldg., Hoboken, N. J., the change necessitated by the rapid growth of business. The new warehouse with its greater facilities is expected to result in still more efficient service to Vulco customers in the east. A. J. Ockelmann is branch manager at Hoboken.

Massachusetts

H. Muehlstein & Co. Inc., crude and scrap rubber merchants, 176 Federal St., Boston, Mass., are moving their office to larger quarters from the fifth to the third floor of the same building. Mr. Costello, who succeeded the late Mr. Sharts, will continue as manager assisted by George Shutt.

The H & R Rubber Co., Wollaston, Mass., has recently been organized to manufacture heels, soles and taps. Messrs. Harlow and Rice, formerly of the Alfred Hale Rubber Co., are the officers of the new concern.

The Seamless Rubber Co., New Haven, Conn., manufacturers of druggists' sundries and dipped goods, are now operating at 80 per cent capacity and expect to increase production in the near future. Business is quite brisk in this line due to more liberal commitments and the cessation of the extreme hand to mouth buying which has prevailed during the last several months.

The Economy Rubber Co., Stoughton, Mass., was recently formed to manufacture a complete line of taps and uplifts. P. H. Clark is factory manager.

The Brockton Narrow Fabric Co. Inc., Brockton, Mass., organized recently with a capital of $25,000, is soon to start the manufacture of narrow woven fabrics, elastic and non-elastic. The initial equipment of the concern will consist of 18 looms. The officers are A. E. Carter, president, F. E. Ahern, treasurer and William Grant, secretary.

C. H. Roper, general factory manager of the Hood Rubber Co. for the past several years, has joined the Endicott Johnson Corp., Johnson City, N. Y., where he will act as factory manager of the rubber footwear department. Mr. Roper is very familiar with footwear manufacture, having been in charge of the manufacturing and cost department of the Watertown concern. The Endicott Johnson Corp., which has been making its own soles, heels and tennis shoes for several years is now understood to be expanding its rubber division to include a complete line of footwear.

D. W. Hollingworth, formerly connected with the National India Rubber Co., Bristol, R. I., a branch factory of the United States Rubber Co., is now chemist with the Continental Fibre Co. of Newark, Delaware.

Clayton F. Mugridge, former superintendent of the mixing and calender departments of the Converse Rubber Shoe Co., has joined the factory staff of the Hood Rubber Co., in the engineering department. Mr. Mugridge, who is a graduate of Dartmouth, has been with Converse since the war.

Edgar N. Weber, who has been employed in the production department of the Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., has resigned to accept a position in the Technical Service Department of the Hood Rubber Co., Watertown, Mass.

The Balloon Rubber Heel Corp. will begin production immediately at its plant at Beverly, Mass. B. G. Gray heads the organization and F. J. Gleason is vice president and manager. The company claims to make one of the lightest heels on the market, combining the principle of an air cushion with a non-skid heel surface.

The Northern Rubber Co. is reported as the purchaser of part of the property of the Ballardvale Mills Co., Ballardvale, Mass. J. Arthur Jenkins is president of the Northern company; Thomas E. Eaton, treasurer; and Everett Sweet, superintendent.

The Sager Co., with main offices at Boston, Mass., announces the opening of a new branch at 39 Washington St., Quincy, Mass. Frederick M. Brebner is the manager. Other branches are located in Brockton, Lynn, Worcester, Springfield and Cambridge, as well as three in Boston.

N. Lincoln Greene, vice president of the Clifton Mfg. Co., Jamaica Plain, Mass., rubber clothing manufacturer, is on a business trip through the West and is at present in California. He is introducing a new line of goods.

Rhode Island

The Woonsocket Rubber Co. will lay off fifteen hundred employes in the Fairmount and Millville plants, from March 16 to April 1. The open winter with the reduced demand for rubber footwear is responsible for the shutdown. A layoff in footwear plants is not unusual in the spring, although neither of the Woonsocket company's plants has been obliged to shut down at this period in the past two years. Both usually close during the summer for a couple of weeks, however.

The Columbia Narrow Fabric Co., Shannock, gave the second annual dinner for its foremen, overseers and office force at the Peckham Inn, on Jan. 27. About thirty officials were present as guests of the company and an entertainment followed the dinner.

The Pilgrim Raincoat Co., Woonsocket, has leased the Newell Ave. property at Pawtucket, formerly used by the Lambert Rope Co., and is transferring its machinery from the Woonsocket plant to the new one. The officers are: Louis Linder, president; Louis Fain, secretary; and Samuel Elovitz, treasurer and general manager. The Pilgrim Raincoat Co. has been in business for the past twenty years, but was reorganized about a year ago. The firm manufactures rubberized raincoats and accessories for national distribution. Approximately 25 persons will be put to work when the new plant begins operations, but within three months at least 125 more will be employed.

Phillips-Baker Rubber Co., Providence, the successor through reorganization of the Bourn Rubber Co., is making extensive improvements to its plant and increasing its facilities by the introduction of additional machinery.

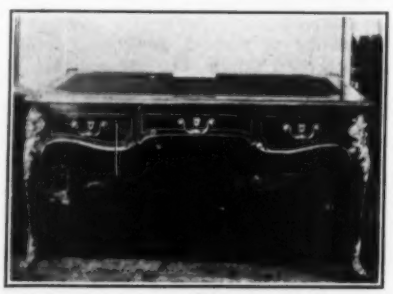
The old Narragansett Rubber Co.'s plant in Bristol has been purchased from the United States Rubber Co. by James A. Conroy, a Fall River business man. This factory has been in existence since 1895 and was started by Terrence McCarthy, under whose direction the concern prospered until it employed 700 hands and produced 12,000 pairs of arctics and tennis shoes. The factory first started as the Byfield Rubber Co., then it was changed to the Consumers Rubber Co., and finally to the Narragansett Rubber Co. Following Mr. McCarthy's death in 1915, the business was continued until 1919 when it was sold to the U. S. Rubber Co.

Davis-Jones Insulated Wire Co., Providence, has increased its capital stock from $330,000 and 200 shares of common no-par stock to $500,000 and 200 shares of no-par common.

The Collyer Insulated Wire Co., Pawtucket, has filed a statement with the Secretary of State's office of an amendment to its corporation charter increasing its common stock from $1,000,000 to $1,500,000.

James Casey, for more than fifty years an employe of the Revere Rubber Co., Chelsea, Mass., died Jan. 26, in Providence, R. I., aged 80 years. He was born at Charlottetown, Prince Edward Island, but had been in this country 57 years. He is survived by two sons and five daughters.

RUBBER BALLOONS FOR CANADIAN DISTRIbution were practically all imported from the United States a year ago. However, as soon as the consumption provided a profitable business, an enterprising firm in Toronto began production on a large scale. Other houses followed suit, so that today a large percentage of local requirements is supplied by Canadian companies.



THIS TABLE INLAID WITH HIGHLY POLISHED RUBBER AND CONSTRUCTED BY CHARLES GOODYEAR, WAS EXHIBITED AT THE GRAND CENTRAL PALACE, LONDON, IN 1851.

Eastern and Southern

H. H. Replogle, manager of the rubber service department of the Grasselli Chemical Co., 347 Madison Ave., New York, N. Y., left for Europe last month and will visit William Somerville's Sons' Rubber Co. Ltd., London, England, representatives for grasselerators in Great Britain. He will also call on the continental trade.

E. A. Guinzburg has been made president of the C. E. Conover Co., 245 Fifth Ave., New York, N. Y., manufacturer of notions, dress shields, baby pants, sanitary outfits, etc. He is also head of the E. A. Guinzburg Co., with offices in the same building, dealing in bathing accessories. The two companies will still be run as two separate organizations with Mr. Guinzburg at the head of both.

Lee Tire & Rubber Co. of New York, Inc., announces the resignation of Harry E. Field as vice president and general sales manager. No successor will be appointed at this time. The responsibility of administering sales policy has been taken over by A. A. Garthwaite, general manager of Lee Rubber & Tire Corp.

The New York Rubber Corp. at a recent meeting of the Board of Directors held in New York, reelected L. D. Bigelow vice president and general manager of the company in full charge of plant operations and sales. Mr. Bigelow reports a steady growth of the company's business since its reorganization last March, and is optimistic with regard to future operations and general outlook for the present year.

James R. White has been made secretary of Jenkins Bros., 80 White St., New York, N. Y., valve manufacturers. Mr. White was vice president of Rickard & Co., industrial advertising agency, for nine years, and had charge of the Jenkins advertising.

American Auto Tire & Supply Co., 144 West 54th St., New York, N. Y., has moved into its own building, which is equipped with every modern facility. The proprietors are M. R. and A. Hellman.

Norwalk Tire & Rubber Co., Norwalk, Conn., elected John W. Whitehead president to succeed William B. Miller, who remains on the board of directors. Mr. Whitehead began his career with the company in 1914 as bookkeeper. Louis P. Arnold was elected second vice president and Dr. W. F. Russell, secretary.

Safety Cable Co., division of the General Cable Corp., is now located at 420 Lexington Ave., New York, N. Y.

Farr and Dyke with Johns-Manville

A. V. Farr, formerly vice president of the Chrome Alloy Tube Corp., has been appointed manager of the sales promotion department of the Johns-Manville Corp., New York, N. Y.

The sales promotion department of this company has been divided into three sections: the market analysis section, advertising section and display section. Kenneth Dyke, formerly with the advertising department of the United States Rubber Co., New York, N. Y., will head the advertising section, with the title of advertising manager.

Omo Manufacturing Co.

After considerable experimentation, the Omo Mfg. Co., 232 Madison Ave., New York, N. Y., now uses rubber from a single plantation that produces one of the finest and most uniform grades of rubber in the world. Each sheet is of laminated, milky white crepe bearing the watermark of the producer, and in spite of the considerable increase in cost, the improvement in tensile strength, aging, cleanliness and general quality of the finished goods has convinced the company that its exclusive use is good economy in the long run. The Omo company is a large manufacturer of bathing caps, rubber aprons, dress shields, etc.

Vulcanized Rubber Co.'s Closing Only Temporary

The INDIA RUBBER WORLD wishes to correct an erroneous impression which may have been created by a news item in the February issue relative to the closing of The Vulcanized Rubber Co., Morrisville, Pa. According to Judson Drayton, treasurer, this was only for the purpose of taking inventory, and all the departments of the plant have been in operation since January 15.

H. W. Butterworth & Sons Co., Philadelphia, Pa., manufacturer of textile finishing machinery, has added W. D. Shields to its southern forces. Mr. Shields, who will operate from Charlotte, N. C., brings with him a knowledge of dyes and the dyeing of practically all kinds of fabric.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has announced the appointment of E. C. Brandt and F. J. Shiring as assistant work managers, and J. E. Webster as chief plant engineer. A. E. Kaiser has been made director of production for all works and S. C. Hoey is now works manager of the Homewood renewal parts works.

The Oak Tire & Rubber Co. has moved its executive office from 606 Phoenix Bldg., 4 East Redwood St., to 101 West 39th St., Baltimore, Md. The factory of the company is in Franklinville, Baltimore county.

The Rubber Service Laboratories Co., Akron, O., it is reported, will transfer all research and development work to its chemical plant at Nitro, W. Va., retaining only the service compounding work at the Akron laboratories.

The New Process Cork Co., Brooklyn, N. Y., and the **Crown Cork & Seal Co.,** Baltimore, Md., manufacturers of rubber stoppers, have consolidated and will have manufacturing operations and executive offices located in Baltimore.

Commercial Tire & Battery Co., 1024 Virginia St., Charleston, W. Va., is a distributer for India tires. The company was formerly known as the Virginia Street Tire Co.

The Hicks Rubber Co., Waco, Tex., exclusive distributers for Dayton Thorobred tires and tubes in Texas, showed a sales gain in 1927 over 1926 of approximately 25 per cent. From a sales volume of $12,000 in 1921, the company reached a total of $2,000,000 in 1927.

OF THE 965,991,508 POUNDS OF CRUDE rubber imported into the United States during 1927, 84.7 per cent was used by American motorists, whose tire bill aggregated $342,532,099.

Ford Article Wins Praise

The article describing the Ford concession on the Tapajos River in Brazil which was published in our issue of December 1, 1927, created a sensation in Para where the exact location and other details given in the story were unknown.

"O Correio do Para" published the complete article, stating in the opening paragraph:

"Below we translate an original and clever article that appeared in the INDIA RUBBER WORLD which is the greatest authority on matters relating to rubber."

Rubber from Florida Fern

Rubber from ferns is being sought by Thomas A. Edison in his Florida investigations, according to a report from Dr. John K. Small, Head Curator of the New York Botanical Garden, who is aiding Mr. Edison.

"While helping to gather prospective rubber producing plants for Mr. Edison's experiments," the announcement says, "Dr. Small is taking advantage of the opportunity to study the native Florida ferns.

"As showing how thorough Mr. Edison's investigations are, even these somewhat unpromising plants are being analyzed for their rubber content."

Pacific Coast

Rubber trade conditions on the Pacific Coast are regarded by industrial leaders as exceptionally favorable, some being of the opinion that the general market for rubber products in this territory has not been in as sound a condition for several years. The outlook for tire sales is especially excellent. The hand-to-mouth buying has eased up considerably, retailers who for many months had been purchasing merely enough to meet immediate demands are now increasing their orders by from 20 to 100 per cent. Assurance from the larger manufacturers in the East and Midwest that there is no likelihood of price change for at least several months to come and unmistakable indications of an early and considerable consumer demand have had a very stimulating effect. A much livelier demand is reported for rubber flooring, prices are holding up well, and in several of the large cities competition has narrowed down from even as high as fourteen a year ago to but five. The business has passed into the control of more responsible concerns, which also note some difficulty in overcoming prejudices caused by the unbusiness-like operations of the concerns that have quit marketing and laying rubber flooring. A decided revival in oil field operations has occasioned a cheerful feeling among makers of oil field and refinery rubber specialties, and many are putting in much overtime on orders. Sales of hose, belting, and general mechanical rubber goods are running well above the level of a year ago.

Hood Rubber Products Co. finds a gratifying increase in sales of tires, tubes, hard rubber battery jars and cases, and general mechanicals, and has booked an unusually large quantity of orders for rubber footwear and heels in the field. Pacific Coast District Manager J. J. O'Connor, 450 Ninth St., San Francisco, Calif., has added many new distributer accounts lately to the company's list.

Coast Tire & Rubber Co. of Oakland, Calif., announces new officers and a change in the directorate. Louis S. Budo, vice president and general manager for several years, has been chosen as president and general manager, succeeding in the presidency J. C. Hughes, who will still remain a large stockholder. Egbert Laub, a Stanford graduate in rubber engineering, is vice president and succeeds Mr. Hughes as a director. C. E. Armstrong succeeds E. H. Russell as secretary. The directors are: L. S. Budo, J. H. Silveira, L. Shelley, E. Laub, and Charles Laub. President Laub announces that plans have been made for one of the most intensive selling campaigns ever conducted by a tire making concern on the Pacific Coast, and that the company will continue its policy of selling directly to consumers through an increased number of factory branches, a plan said to have proved much more satisfactory than the retailer-customer plan.

New York Belting & Packing Co. is one of the many eastern concerns which note a relaxation of the too conservative attitude which had been maintained for many months by buyers in the Pacific Coast territory, and has recently experienced a decided improvement in business. Purchasers are buying for more than their immediate requirements and replenishing stocks that were undoubtedly much depleted. The company's main branch is at 519 Mission St., San Francisco, A. H. Gregory being in charge.

Goodyear Tire & Rubber Co. of Akron has had two of its leading executives busy on the Pacific Coast lately conferring with the sales organizations at the chief distributing centers, Vice President F. K. Espenhain and General Sales Manager R. S. Wilson. After sessions in Seattle and San Francisco they went to Los Angeles, where they were guests of President John W. Mapel of the California Goodyear company and addressed a large gathering of salesmen and dealers. They planned before returning to Akron to make a business trip that will include most of the states of the union. Production of casings at the Los Angeles factory mounted during February from a minimum of 9,000 to a maximum of 10,000 daily, breaking all records.

Pennsylvania Rubber Co., Jeannette, Pa., had two of its executives, Vice President E. E. Thorpe and General Sales Manager L. J. Waldron, lately looking over business prospects on the Pacific Coast. They are reported as well pleased with the sales in this field and much encouraged with the outlook.

Sherbondy Rubber Co., Norwalk, Calif., which occupies the plant formerly operated by the Bra-den Tire & Rubber Co., has completed its financing and has installed among other new equipment a 60-inch mill. The president, Edward L. Sherbondy, states that the company will make not only tires and puncture-proof tubes under his patents, but also rubber paint of many shades and containing an average of 60 per cent by volume of reclaimed rubber prepared by an exclusive process and which is said to possess many advantages over non-rubber paints. Tube production was scheduled to begin March 15 and paint making April 1.

Eno Rubber Co., 2012 Border St., Torrance, Calif., which maintains an office at 1726 S. Los Angeles St., Los Angeles, was never so busy, according to President Roy R. Musser. The working force has been much increased, overtime is done four nights a week, and much new equipment is being installed. Leading products include oil well and mechanical goods in wide variety, pneumatic cushions, and various specialties.

Pacific Goodrich Company

Pacific Goodrich Rubber Co. is hurrying its big plant in Los Angeles to completion, and Vice President S. B. Robertson, who has just returned from the parent concern in Akron (after making his seventh trip in the past six months), is confident that the new factory at Mines and Atlantic Avenues will start production on March 15. Mr. Robertson was accompanied by Mrs. Robertson and daughter, his son following later. They will make their home in Los Angeles, where Mr. Robertson will be chief in charge of factory operations. It is said that all but 60 of the 1,500 employes of the new plant will be Los Angeles residents. Production will be rapidly stepped up to 5,000 casings and 7,500 tubes daily. Another important Goodrich official who has arrived is F. E. Titus, recently appointed general sales manager for the Pacific Coast unit and who will organize the departmental and executive branches. It is his first visit to the Coast and he has already started on a trip that will cover practically all the territory between Mexico and Canada. Mr. Titus has served the Goodrich concern for twenty-one years, latterly having charge of the New York district. Another Goodrich executive to arrive is E. S. Sargent, former general credit manager in Akron, and who will become secretary-treasurer of the Pacific company.

W. J. Voit Rubber Co. as a new corporation has taken over the business done by a firm under the same name at 1604 E. 26th St., Los Angeles, and that of the V-T Rubber Co., at 970 S. Alameda St., in the same city. The company has been authorized to dispose of 1,000 of its 2,500 $100 shares for financing purposes. Mr. Voit, after whom the company is named, is the chief stockholder, and associated with him are Thomas B., Thomas R. and Vivian E. Edkins, Margaret Voit, Gerald L. Foley, Frederick Barber, and M. G. C. Harris. The products include inflatable sport balls, seat cushions, novelties, and tire repair stock.

Paragon Rubber Products Co., organized to take over the plant of the former Paragon Rubber Co. at 4827 Huntington drive, Los Angeles, has elected these officers: President, R. H. Thompson; vice president and secretary, Harold G. Coggswell, whose exclusive processes will be used; and treasurer, J. W. Thompson. The products are chiefly oil field supplies, tire repair materials, and general mechanicals. Several hydraulic presses have been lately added, the other equipment overhauled and working time speeded up to 24 hours a day.

Golden State Rubber Mills, 1920 E. Vernon Ave., Los Angeles, Calif., has established national distribution for a unique pure rubber tank ball and is working overtime on this product and on oil field specialties and general mechanicals. President Emmet S. Long, who had been ill at a local hospital, is well again and back at the plant.

Progress of Firestone Plant

Firestone Tire & Rubber Co. of California is making substantial progress in the building of its Los Angeles factory. Operations are managed by Vice President C. A. Myers of the parent company in Akron, and he will remain in Los Angeles until the new plant is on production basis. All work is being done by local contractors, there have been no delays on account of labor or materials, and the chances are that the big plant will be quite finished before midsummer. In the middle of February it was reported as 25 per cent complete. The mechanical building is already finished, the concrete foundations for most of the structures have been laid, and the steel skeleton of the main tire building unit is nearly complete.

Following the announcement from Akron of the appointment of R. J. Cope, Los Angeles branch manager, as general manager of the new factory, comes the information that the new branch manager is H. A. MacKellar, heretofore Detroit branch manager, and who has had Firestone sales experience for twelve years in New York, Buffalo, Albany and Akron.

Griffith Rubber Mills, 519-523 N. 22nd St., Portland, Ore., according to Assistant Manager U. A. Keppinger, is doing a large business in rubber-covered rolls for paper mills and in various mechanical rubber articles. A specialty finding extensive sale is the Griffith Grippo Non-Slip pulley, made of tough, non-glazing, non-absorbent rubber-cork-fiber composition and said to have unusual power transmission, making belt dressing needless, and showing other economies. Canadian patents have been granted and U. S. patents are pending.

Midwest

The Gillette Rubber Co., Eau Claire Wis., is preparing for a 1928 production very considerably in excess of last year's mark. A new addition to the "black" room recently has been completed and machinery is now being installed in this section. A new Banbury mixer is being set up, along with two 80 inch mills. The company has had a new molded inner tube on the market for the last sixty days. The water cure tube also is in manufacture and still constitutes the bulk of the tube production, but the company will shift its machinery to make the new type of tube exclusively.

The Karg Tire & Rubber Co., 6555 West 65th St., Chicago, Ill., plans to manufacture 1,000 tires daily. The company specializes in a puncture proof tire, the Gostling.

The Mansfield Tire & Rubber Co., Mansfield, O., has announced the appointment of Hibbard, Spencer, Bartlett & Co., wholesale hardware dealers of Chicago, Ill., as distributers of its complete line of tires and tubes.

Wishnick-Tumpeer, Inc., announces the purchase of the controlling interest in the Century Carbon Co., which will be operated under the direct supervision of the former organization, producing the well known Witco brand products. Robert I. Wishnick is president, and David Tumpeer, secretary and treasurer. The general offices of the company are located at 365 East Illinois St., Chicago, Ill. No change is contemplated in the production end of the business, which will remain under the same supervision as in the past. This purchase is another step consistent with the Wishnick-Tumpeer policy. It is that of conducting its own manufacturing operations or alining itself as exclusive agents with manufacturers of the products which they offer.

Canada

Advice received from Toronto is to the effect that, due to changing conditions in the rubber market, prices on belting have been advanced recently about 10 per cent and the market is operating on a very firm basis. The rubber companies have got through with booking orders for the coming season's tennis footwear. The 5 per cent discount period ended with December 31. It is reported that merchants have ordered staples freely but have not responded very well to the fancier lines, despite all efforts to boom them. The next feature will be placing orders for rubbers, which will not start until March 1, when the 1928 prices will be announced, and buyers will have until May 1 to book at the special discount.

The open weather in certain parts of the Dominion has caused some activity in tires and tubes. The new low-priced tire mentioned in these columns quite recently is already being felt as the dealer can now supply new tires for a price formerly charged by some repair firms for rebuilt old tires.

The Quebec Rubber Co., Ltd., Quebec City, has recently reorganized its selling force and appointed as general sales manager Oscar LeBel, who has been in the rubber industry for over twelve years. The company's office is at 1389 Notre Dame St. East, Montreal.

W. A. Pope, sales manager of the Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ontario, recently addressed Studebaker dealers of Eastern Canada at their sales convention held in Montreal.

Gutta Percha & Rubber, Ltd., Toronto, Ontario, is conducting a word contest and prizes are being distributed to those who can make the most words from "Gutta Percha Tires." The contest closes April 15.

Colonel Massie, of the Dominion Rubber Co., Ltd., St. John, N. B., branch, reports that conditions in the rubber footwear industry are better than for several years past, due not only to better sales opportunities, but also to the fact that factories are adjusted to the new styles and shapes. Now, he said, there is a rubber for every shape in leather shoes and many women have four or five pairs of overshoes of different color to match stockings and gown.

J. A. Thompson, advertising manager of Seiberling Tire & Rubber Co. of Canada, Ltd., Toronto, Ontario, described in a recent issue of *Marketing* how Seiberling succeeded in getting dealer cooperation in marketing its product in Canada.

Firestone Tire & Rubber Co. of Canada, Ltd. New branch offices are being opened in Toronto and London to cope with the increased demand for Firestone tires.

Goodyear Tire & Rubber Co. of Canada, Ltd., is operating at capacity in all departments, and the new plant unit, which was completed at the beginning of the year, adds substantially to the potential producing power.

Essex Tire Dealers. Tire dealers of the County of Essex, Ontario, have formed the Essex Association of Ontario Tire Dealers under the presidency of A. G. Hemple, one of the large tire dealers of Windsor, Ont. R. H. Marentett is vice president and R. M. Martin, 209 Ouellette Ave., Windsor, Ont., secretary-treasurer.

L. G. Bowker, manager of the Automotive Equipment Co., distributers of Firestone tires, presided at a banquet held recently in Montreal when 200 dealers were guests of the Firestone Tire & Rubber Co., of Canada, Ltd. It was announced that an addition of 108,000 square feet had just been completed at Hamilton.

J. A. Livingston has been made sales manager for Canada, The Firestone Tire & Rubber Co. of Canada, Ltd., announces, succeeding W. A. Pope, who has joined the Studebaker Corp. of Canada, Ltd.

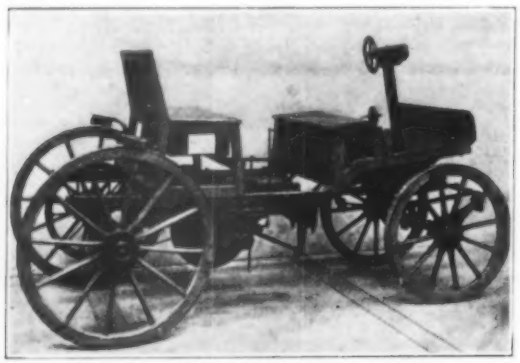
Rubber Imports. Canada imported $1,918,038 worth of rubber in December, 1927, and of this total the United States is credited with exporting to this country $1,821,192. For the twelve months of 1927 Canada's imports of crude rubber totaled $22,623,511, a drop of nearly $2,500,000 from the preceding year.

Canadian Tire Production. The production of tires in Canada during the first eleven months of 1927 numbered 3,428,685. Of this number 1,411,818 were exported, Brazil, Ceylon and Straits Settlements taking large quantities. The annual output value of the Canadian rubber industry has almost reached the hundred-million mark and now ranks eighth in the list of factory industries of the country.

A Forgotten Pioneer

It is the lot of some men to receive instant and full recognition for their achievements during their lifetime. Others, as worthy, are doomed to struggle through a life of disappointment, their works unheralded and unrewarded. This was the fate of Siegfried Marcus, the inventor of the first benzine driven automobile. Few, even among authorities in the automobile world so much as know his name. But now, almost thirty years after his death, the agitation of the few who did know of his works is to bear fruit and a monument is shortly to be erected in Vienna to remind the world of this pioneer worker in the automotive field.

Siegfried Marcus was born on September 13, 1831, in Malchen, Mecklenburg, Germany, and died in Vienna on July 1, 1898. After an apprenticeship in Hamburg and some years spent with the firm



The First Benzine-Driven Automobile

of Siemens & Halske, he left for Vienna in 1852, and there, in 1860, opened his own workshop. Four years later, in 1864, he constructed the first wagon run by benzine. Its trial run, which took place in secret at night owing to police interference, proved to be a complete failure. Not to be discouraged, the inventor set to work again and in 1875 produced a second car. Both vehicles were equipped with benzine motors, carbureters and magneto-electric ignition systems of his own invention. One of these cars is on exhibition at the exposition "Vienna and the Viennese," by the Austrian Automobile Club.

The interest for the rubber industry in this reminder of a practically forgotten genius is enhanced by the fact that members of the Marcus family have for many years been connected with the rubber business. Thus Edward Marcus, head of Edward Marcus & Co., the New York branch of Heilbut, Symons & Co., crude rubber importers of London, England, and Siegfried Marcus were brothers. Their nephew, Charles Loewenthal, became head of the branch when his uncle Edward Marcus retired in 1881, and changed the firm name to Charles Loewenthal & Co. This firm subsequently became Reimers & Meyer, and after the partners retired it was known as Poel & Arnold, and now Poel & Kelly.

The late Rudolph Low, a pioneer in the reclaiming industry, was a nephew of Siegfried Marcus and his son Clarence H. Low, the well-known crude rubber man, is a direct descendant, being a great nephew of the inventor.

ANTI-OXIDANT SURFACING

It is claimed that the aging of hard rubber articles can be much delayed by coating them with a phenolic or synthetic resin varnish, which, by absorption of ultra violet or actinic light rays, checks discoloration and disintegration of the rubber material.

PURCHASERS OF NEW AUTOMOBILES PAID A TOTAL OF $4,442,122.99 to the Federal Government in excise taxes during December, 1927, according to figures prepared by the American Motorists Association.

AUTOMOBILE CASINGS SHIPPED FROM U. S. DURING 1926 AND 1927[1]

The following statement shows the number of automobile casings exported from the United States to foreign countries during 1926 and 1927, the countries being arranged in the order of their importance as "best customers" in 1927. The revised passenger car registration for each market, is indicated in the right hand column, this being based on reports recently received by the Automotive Division.

	No. of Casings Shipped by U. S. 1926	Rank as Casing Customer of U. S. 1926	No. of Casings Shipped by U. S. 1927	Rank as Casing Customer of U. S. 1927	Passenger Car Registration
Argentina	200,698	1	305,114	1	205,000
United Kingdom	151,980	2	209,056	2	767,602
Germany	80,628	5	159,007	3	218,000
Brazil	78,128	8	157,207	4	60,800
Cuba	114,481	3	135,469	5	28,303
Denmark	45,308	12	125,898	6	61,825
Hawaii	91,981	4	113,510	7	25,021
Philippine Island	58,074	10	112,166	8	15,903
Spain	38,616	15	99,314	9	121,500
Mexico	80,122	6	94,687	10	38,110
Brit. Ind. and Ceylon	39,454	14	90,659	11	74,816
Australia	46,668	11	87,575	12	302,506
Japan	79,123	7	81,171	13	29,319
Sweden	40,822	13	80,936	14	77,000
Netherland E. I.	30,294	16	64,281	15	46,612
Porto Rico	62,253	9	63,474	16	11,450
Netherlands	24,026	18	55,835	17	43,094
British Malaya	14,536	29	45,546	18	19,620
Italy	4,460	42	43,863	19	104,882
British S. Africa	17,274	22	37,626	20	83,140
Switzerland	13,792	30	34,436	21	41,800
Uruguay	29,461	17	33,431	22	25,050
Chile	16,572	23	30,830	23	14,400
Czechoslovakia	11,146	33	29,298	24	20,000
Belgium	15,071	27	28,724	25	59,108
Austria	2,993	49	28,068	26	12,252
Colombia	17,671	21	27,866	27	5,425
Poland & Danzig	3,213	47	27,804	28	14,652
Venezuela	19,912	20	26,760	29	8,000
China	20,928	19	25,155	30	16,012
Rumania	3,806	45	24,651	31	11,308
Canada	14,869	28	23,734	32	733,692
France	16,052	25	23,597	33	542,979
Finland	10,156	34	20,814	34	12,094
Greece	8,067	37	20,473	35	7,054
Peru	12,984	31	19,954	36	5,550
Norway	16,279	24	18,153	37	21,100
Portugal	9,216	35	16,857	38	12,845
Dominican Republic	8,517	36	15,804	39	2,275
Panama	11,569	32	13,725	40	4,579
Palestine & Syria	5,188	40	11,013	41	4,996
New Zealand	15,196	26	10,450	42	101,462
British East Africa	2,987	50	9,470	43	7,865
Egypt	5,199	39	8,871	44	15,200
Canary Islands	4,703	41	8,374	45	2,906
Turkey	1,453	60	8,078	46	6,000
Guatemala	4,380	43	7,666	47	1,337
Morocco	765	67	7,434	48	16,043
British West Africa	2,229	56	6,290	49	3,232
Yugoslavia & Albania	2,660	52	6,227	50	6,953
Hungary	1,109	62	4,981	51	6,712
Costa Rica	2,654	53	4,933	52	659
Haitian Republic	3,142	48	4,876	53	1,764
Persia	2,320	55	4,531	54	3,500
Neth. West Indies	2,511	54	4,420	55	585
Iraq	6,230	38	3,813	56	2,315
Irish Free State	2,811	51	3,774	57	29,331
Salvador	4,227	44	3,764	58	1,250
Paraguay	457	76	3,677	59	412
Alaska	3,218	46	3,668	60	1,153
Ecuador	1,926	58	3,289	61	832
Trinidad & Tobago	845	66	2,310	62	2,675
Bolivia	1,052	63	2,023	63	1,350
Newf'd & Labrador	1,797	59	1,639	64	1,197
Jamaica	536	72	1,564	65	3,837
Honduras	2,060	57	1,552	66	384
Bulgaria	136	90	1,460	67	1,700
Other Ports, Africa	580	71	1,370	68	700
Sov. Russ. in Europe	896	65	1,325	69	*6,832
Siam	384	80	1,245	70	2,257
Estonia	101	91	1,146	71	598
Azores & Mad. Island	616	70	1,142	72	701
Mozambique	353	81	1,118	73	500
Other countries	8,663	....	11,137	....	56,215
Totals	1,654,584	....	2,811,158	....	4,198,131

[1] Special Circular No. 1837—Rubber Division, Department of Commerce, Washington, D. C.

*Entire Russia.

SEEKING BETTER TENNIS BALL

While the modern tennis ball serves its purpose quite well, there is still need of a better ball, observes Herbert Standring. Such a ball, it is held, should be made of an impervious rubber which will retain the inflation, give and preserve the requisite tension, rebound and flight, withstand climatic influences, and suit various surfaces found in the game.

The Rubber Industry in Europe

Great Britain

Preliminary statistics regarding the rubber trade of Great Britain during the year 1927 have just been published and show a marked decrease in both the imports of crude and manufactured rubber and the exports of manufactured rubber goods. While the actual amount of crude rubber entering Great Britain during the year totaled 145,319 tons against 143,286 tons in 1926, showing a slight increase, the re-exports of crude rubber were 85,072 tons in 1927 as compared with 58,352 tons the year before, leaving the amount of rubber retained in the country in the respective years at 60,247 tons and 84,933 tons. The decrease in net imports, however, does not mean that home consumption has decreased for, as is pointed out, stocks in London and Liverpool rose by only 16,094 tons in 1927, while in 1926 the increase was 44,993 tons. When these figures are taken into consideration, the net result is an increase in the quantity of rubber retained in the year under review amounting to something over 4,000 tons. On the other hand there has been a real and substantial decrease in imports of gutta percha and balata during the last years, the figures for 1926 and 1927 being respectively 7,973,800 pounds and 4,874,700 pounds, against 10,583,700 pounds in 1925.

Imports

The total value of imports of manufactured goods dropped from £8,261,522 in 1926 to £6,273,920 in 1927, the most marked decrease being noted in the case of tires and tubes, values for which fell from £4,849,474 in 1926 to £3,127,927 in 1927. Imports of rubber footwear, which came to 465,476 dozen pairs in 1926, were 428,650 dozen pairs last year, while the value of balata belting was £238,035 in 1927 instead of £283,037. There were increases in purchases of waterproof apparel, £74,709 against £27,320, and in other manufactures of rubber for which the figures were £1,603,413 in 1926 and £1,691,478 in 1927.

Exports

Coming to the exports of manufactured goods, we find that here too the values for tires and tubes fell considerably having been £3,743,033 last year against £4,524,162 the year before, though the most noteworthy decrease was that of submarine cables, totals for which fell from £2,001-016 to £547,998. This is largely responsible for the fact that the total values of exports for the year considered were £11,-159,579 instead of £13,113,949. A slight increase is to be noted for exports of footwear (£407,132 against £395,217) and waterproof apparel (£1,167,403 against £1,162,205). Shipments of other rubber manufactures again showed a decline, this time from £3,027,155 to £2,890,782.

It is considered that the declines in values noted above are mainly due to the drop in prices of manufactured goods during last year.

New Mergers

As was to be expected, new mergers have followed the one reported last month. The Anglo-Java Rubber & Produce Co., Ltd., has decided to increase the capital of the company to £1,250,000 by the creation of 8,700,000 new shares of 2s. each to complete an amalgamation whereby the company acquires a group of foreign owned estates in Johore, Malaya, comprising some 25,102 acres of land of which 21,664 acres are planted with rubber, mostly mature. At present, these estates have an annual output of several million pounds of rubber. The rubber expert, J. K. Swaine, has reported on these estates and estimates their productive capacity for the first year at not less than 6,006,675 pounds of rubber, increasing in the seventh year to 7,248,550 pounds. He values the properties, including the buildings, machinery and factories, at £2,560,715, which considering that the Anglo-Java company pays £1,860,000, leaves a margin of over £700,000. This valuation is based on an average price of 1s. 8d. per pound for rubber over the next seven years.

These new acquisitions added to the areas the company already controls bring the total acreage owned by the concern to 39,529 acres, of which about 32,559 acres are planted. This includes 817 acres of coffee and 27,619 acres of mature rubber. The productive capacity of the estates (of the company's own area plus that of the newly purchased lands) is estimated at 10,415,675 pounds for the first year, increasing to 12,034,050 pounds in the seventh year. Working costs of the old and new estates have been figured out at 6.33d. per pound, f. o. b.

Java Rubber Merger

Particulars have now been published regarding the proposed amalgamation of the British Rubber Estates of Java, the Waverley Plantations, Toegoesari Rubber Coffee Estates and Tybar (Java) Plantations. The first mentioned firm, for the purpose of absorbing the other three companies, will increase its capital to £1,-250,000 in 12,500,000 shares of 2s. each. The British Rubber Estates will get 2 shares for 1 now held, the Waverley 12 shares for 10 now held, the Tybar 7 for 10 now held and Toegoesari, 8 for £1 now held. The issued capital will be £719,866, leaving £530,134 in reserve and available for further absorptions. The total planted area is 13,233 acres, of which 9,635 acres are planted with rubber. Besides this, there are 12,263 acres of reserve land, which brings the total acreage to 25,496 acres. The planted area will stand in the books of the company at a capital cost of £47.12s. per acre, which should be reduced as further areas are opened up. The production of rubber from the combined estates is estimated for 1928 at 2,198,300 pounds.

New Rubber Road

The work of laying 300 square yards of Cowper's rubber paving blocks in Thurloe-Place, South Kensington, London, has just been completed. Since the stretch in question is subject to very heavy traffic, the blocks will undergo a very severe test. The blocks used this time are a great improvement over the first Cowper blocks which, it may be remembered, were used in a test in Borough High St., Southwark. The new blocks are twin blocks, or double rectangular, and are so constructed that they interlock automatically, and as the tops and bottoms are of softer rubber while the core is hard, the tops take the friction of the traffic, the center the load, and the base the shock. The new Cowper block costs one and a half times as much as a wood block, but should last twice as long, so that in the end the use of the rubber block should prove much more economical than if wood blocks were employed.

Besides the paving block, Cowper has devised a rubber flooring block which follows the principle of the paving block in slab form. At present this type of rubber flooring is giving satisfaction in a trial in the Kaffir market of the London Stock Exchange.

Waste Rubber

Reports of business on the British waste rubber market are encouraging. Business has been very steady of late and there is a good demand for all standard grades. Manufacturers in England and on the Continent fear a shortage and inquiries are coming in so rapidly that many, especially for the prime floating qualities, have had to be turned down as dealers are unable to supply this grade for prompt delivery. Another sign of the times is that manufacturers are not so particular in regard to general specifications.

That the waste trade during last year on the whole must have been comparatively active, seems to be indicated by figures of imports and exports of waste and reclaimed rubber as published for Great Britain. Imports increased from 6,518,200 pounds, value £99,999, in 1926 to 7,436,000 pounds, value £114,182 in 1927. Exports rose from 23,803,100 pounds, value £286,-020, to 27,091,100 pounds, value £277,614.

ACCORDING TO EMIL SALMSON, PRESIdent of the Swedish Automobile Importers Association, motor transport needs of Sweden during 1928, will require the importation of 18,000 cars.

Germany

Although 1927 brought many disappointments with it, yet a general survey leads to the conclusion that on the whole the more prosperous condition of Germany during the year was not without its effect on the rubber industry. This is reflected in the greatly increased imports of crude rubber which were 27,377 tons in the first nine months of 1927 as compared with 14,735 tons in the corresponding period of the previous year. To be sure, it is said that this increase is largely due to purchases for Russian account in Hamburg. Nevertheless, the increased German consumption of rubber goods of local manufacture must have reacted on the imports of the crude article.

During 1927, efforts to rationalize the industry took a more positive turn, many of the larger firms introducing new measures and equipment to improve efficiency in manufacture. In the tire industry, the overhauling of tire standards and reduction of the number of sizes was an important step in the right direction. A similar movement was also instituted in the mechanical goods branch, particularly with regard to sizes and types of hose and packing. The mechanical goods section seems to have been in special need of reorganization, for manufacturers not only produced any number of sizes and types, but sinned particularly in the matter of underselling and lowering the quality of their products. However, they appear to have turned over a new leaf, and have come to an agreement among themselves to improve quality and to fix minimum prices, so that in certain lines, at least, quality is getting better and cut-throat competition has been checked.

Business Difficulties

For practically all branches of the rubber industry, the handicaps to successful business expansion that had to be faced before, again made themselves felt in 1927. Export was limited, either due to specially introduced high tariffs, or to the fact that former export markets were occupied by other nationalities. Payments were slow, particularly toward the end of the year, when there was much complaining to be heard of credits overdue; in addition, industrial taxes continued to weigh heavily. In spite of these adverse factors, the industry seems to be on a much sounder basis than it has been for some time and there is reason to regard the outlook as more hopeful.

German Rubber Novelties

Certain German producers seem to have a peculiar knack for rubber toys and novelties that catch the eye either because of their finish or the amusement they cause. Some of them appear to take particular delight in devising new inflatable articles, the variety of which is truly astonishing and range from the huge and grotesque figures of animals and dolls, so popular at the seashore, to tiny squeaky balloons. The Harburger Gummi-Waren Fabrik, Phoenix, is one of those firms that make a specialty of the huge floating animals and figures, their latest additions being a mermaid and a dandy, frankly without any pretense at being realistic, and most surprisingly designed and colored. The Lick-Paramount concern, Berlin, has a similar line, but the animals have a special device which, it is claimed, prevents them from capsizing when in the water.

Of quite a different character, but not less amusing, are the rubber fruits, cakes, rolls, sausages, cigars, etc., purposely made to look as natural as possible—the rubber doughnuts are topped with real sugar and the cigars have authentic-looking bands—the more completely to surprise the unsuspecting victim who is lured into an attempt to sample one or other article only to have it squeak when he handles it. The Leipzig firm Weisz & Baeszler is one of those firms that produces this type of goods, besides other lines. The specialties of the Belinde Werke A. G., Wandsbek, are chiefly of sponge rubber. Its latest novelty in this material is a line of sponges for school children, which certainly should appeal to the little ones as they come in the shape of elephants, butterflies, dogs, cats, pigs, fish, chickens, etc.; they are made to retail at 10 pfennings each. The same firm also recently added to its collection of rubber animals a well modeled group consisting of rooster, hen and chicks, standing about 13 inches high.

Tire Price Cuts

It is reported that the firms belonging to the German Union of Tire Factories, Berlin, have decided to cut the prices of tires considerably, the new prices to be effective as from January 2, 1928.

Russia

Figures prepared by the Soviet Government throw an interesting light on the progress of the Russian rubber industry since 1920. In the tables, no figures are given for the years 1920 and 1921, but in 1922, 82 tons of footwear, valued at 135,000 rubles and 82 tons of other rubber goods, valued at 125,000 rubles, were exported. The following year showed an increase in footwear shipments to 209 tons, value 396,000 rubles. The period 1923-24 found footwear exports at 150 tons, value 283,000 rubles; in 1924-25, 348 tons, value 1,397,000 rubles; 1925-26, 415 tons, value 1,580,000 rubles, while for the first nine months of the period 1926-27 the figures for footwear are given as 408 tons, value 1,455,000 rubles, and for other rubber goods as 47 tons, value 127,000 rubles.

The Russian Rubber Trust reports that while it had been expected to cut costs of production by 9.8 per cent during 1927 as compared with 1926, the costs could not be reduced more than 9.2 per cent. This was chiefly due to increased expenditure for wages and secondary materials. The cut was effected because of lower costs for crude rubber and management. However, the Trust suffered a certain loss as it had lowered the prices for its products by over 4,000,000 rubles and this was not covered by the reduction in costs.

Latvia

The Latvian rubber industry dates back to the year 1856 when J. N. Muendel established a small rubber factory at Riga, then a part of the Russian Empire. However, although the Treugolnik was founded at St. Petersburg in 1860 and operated on a large scale, the Russian rubber industry was not solidly established until 1888, when the Prowodnik Co. was formed at Riga. Originally the firm was almost completely under French control, but later the Russian element became more prominent. The factory was successful and by the end of 1913 the concern was said to have a capital of about $9,000,000 and reserves of $22,000,000. In 1890, the Freysinger plant, reorganized in 1896 and afterward known as the Caoutchouc, was established at Riga. Before the war, the combined output of these three concerns was reported to be over $29,000,000. After the outbreak of the war in 1914, the works were dismantled and evacuated, and though the efforts of local manufacturers after the war to reestablish the Latvian trade have been successful, there seems to be little likelihood that the Prowodnik will be reopened.

There are now four factories in Latvia, the Baltic India Rubber Co., Quadrat, founded in 1924, and in 1926 giving employment to about 800 workers; The Rigaer Gummi Manufactur Continent, which employed about 600 workmen in 1926 and had an estimated output of 2,000 pairs of galoshes per day; the Gumijas Lietu Fabrika Varonis established in 1921 and having about 200 workers producing 200 pairs of galoshes per day in 1926, and the Latvijas Gumijas Rupnieciba Vairogs, also formed in 1921, but which does not operate steadily employing irregularly between 10 and 30 hands. Quadrat and Continent practically produce galoshes exclusively while Varonis gives more attention to rubber toys and surgical goods. The daily output of rubber footwear is said to be over 5,000 pairs, which comes to about 1,250,000 pairs per annum. The local annual demand is put at 500,000 pairs, leaving a large surplus for export. The neighboring states Estonia, Lithuania, and Poland, besides Rumania, Bulgaria, Yugoslavia, Czecho-Slovakia, Turkey, Austria and Switzerland, are Latvia's chief customers.

WHITE GUTTA

A native product of Siam exported to foreign markets is white gutta which is produced from latex of an evergreen tree, the Palaquium obovatum. The gum is said to be the best non-conductor known for both heat and electricity and has a high commercial value.

FINLAND IMPORTED 795 LONG TONS OF crude rubber during 1927, a slight gain over the 1926 figure of 734 long tons.

The Rubber Industry in the Far East

Malaya

At a gathering held under the auspices of the Perak Planters' Association, Major B. J. Eaton, of the Rubber Research Institute of Malaya, delivered a rather lengthy lecture on the subject of Rubber Preparation and Estate Factories. By way of preface, he outlined briefly what the Rubber Research Institute is now doing. The Institute started about a year ago and until the middle of 1927 consisted only of the director and three officers who were in the country, including himself. Now the director has succeeded in getting together a good staff and the past five months have been devoted almost entirely to organization. The work of the Institute has been divided over different divisions. The Botanical Division is under Colonel Summers, who has had experience of rubber in Ceylon and wide experience generally. This division will take up seed selection and bud grafting chiefly. The Soil Division is under Dr. W. B. Haines, who was formerly connected with the Rothamsted Experimental Station in England, and the Pathological Division has been entrusted to Dr. Weir, who has much experience in forest pathology and knowledge of the rubber tree in the Amazon territory. The lecturer himself is continuing the work on which he has been engaged for the last fifteen years. It is expected that work will be in full swing within a month or two. Meantime the Institute has acquired 2,000 acres of land 12 miles away from Kuala Lumpur, which it is planned to develop on the most modern lines.

The Lecture

Mr. Eaton began his lecture by saying that since there is no easy and direct method of determining the real quality of raw rubber and it is judged by the buyer, who is generally not the manufacturer, according to a standard based primarily on appearance, which often has nothing to do with quality, certain compromises are necessary if the producer is to satisfy both the requirements of the market and those of the manufacturer. As far as the manufacturer is concerned, the most important defect is the presence of foreign matter in the rubber or adhering to it. But to obtain his full price, the producer must avoid also the defects which will lower the value of his product on the market.

Preparation of Smoked Sheet

Smoked sheet is more subject to defects than any other grade of rubber and special care is needed in its preparation. With reference to preparation, Eaton pointed out that whereas in Malaya the latex is diluted to a dry rubber content of 1½ pounds per gallon, before being coagulated, while the coagulum is machined the day after coagulation, the Dutch dilute to a dry rubber content of two pounds per gallon and machine the coagulum on the day of coagulation. The advantages of the Dutch method, are that it involves a smaller capacity in coagulating pans and tanks, and probably gives a more uniform curing rubber; the sheets are larger and the same amount of rubber can be machined in less time, while finally, fermentation, causing bubbles, is less likely to occur. The disadvantages are: less economy in coagulant and working late by artificial light.

Defects of Smoked Sheet

The two most common defects in smoked sheet are bubbles and molds. Bubbles are caused by fermentation due to delay in collecting and shipping latex to the factory, excess of coagulant resulting in too rapid coagulation, lack of cleanliness of water or utensils, but chiefly due to fermentation under anaerobic conditions, as often happens when the latex is coagulated in tanks instead of pans. To remedy this condition, sodium bisulphite is mainly used in Malaya as an antiseptic in cups and pails in the field or in tanks in the factory. The Dutch prefer ammonia and sodium carbonate.

Molds have during recent years given most cause for complaint; the lecturer considers that this greater prevalence of molds at the present time is due to the more rapid smoking of rubber with a more highly combusted fuel which contains a lower amount of antiseptic substances. Today almost any smoked sheet unless treated with a powerful fungicide, will develop mold if conditions are favorable. Light surface mold does not affect the quality of the rubber, but heavy mold causes a loss of weight, sometimes amounting to as much as 5 per cent in about two months. The best method of preventing mold is to soak the freshly machined sheet in a solution of 3¼ ounces of para-nitrophenol in 20 gallons of water.

Pale Crepe

Pale crepe of uniform appearance is easier to prepare than uniform smoked sheet. It is necessary to add sodium bisulphite to the latex before coagulating when pale crepe is to be made as normal latex darkens due to the oxidation of certain constituents of the latex. Sodium bisulphite deteriorates rapidly in a damp tropical climate, therefore when drums are opened the contents should if possible be immediately placed in smaller tins which are kept well closed, and hold only enough for a few days' use.

The most important and most common defect of pale crepe is spot disease, indicated by the development of spots of blue, black, red, yellow, orange or green, in the crepe, generally after it has hung in the drying chamber for several days. The spots are caused by fungi and bacteria, the spores of which are present in all rubber and only require enough moisture and air to develop and produce the discoloration. Excess or deficiency of sodium bisulphite also favors the disease. Efficient and rapid drying, which involves the preparation of a thin crepe, is considered to be the most effective preventive.

Future Methods of Preparation

After discussing the other forms in which rubber is marketed, Mr. Eaton suggested that the future method of preparation might consist of a bulk product, treated with a fungicide to prevent mold and dried within a reasonable period by heat from coal or oil furnaces if wood becomes too expensive. The Rubber Research Institute, it seems, will investigate alternative methods of preparation and examine the properties of rubber prepared by different methods, while at the same time variability in quality, the variability of plasticity, for instance, will be studied.

Cressonite Floor Tile

Lionel Cresson, of the Singapore Rubber Works, known as the inventor of the Cresson block which has been used in a test in Singapore and which is to be given a trial in London, has recently invented the Cressonite floor tile. This tile is manufactured by the Singapore Rubber Works and has just been put on the market. It consists of a mixture of rubber and cement and is laid directly on a surface of wet Portland cement. In this way the use of special mastic cement is avoided and it is not necessary to employ specially trained workmen for the work. It is claimed that the new tile, which is to be had in a variety of styles and colors, forms an ideal flooring material.

Ceylon

The standard production of rubber estates for the sixth year of restriction, November 1, 1927 to October 31, 1928, is, subject to minor adjustments, 76,300 tons. The standard production figures for previous years were: 60,034 tons for the first year, 62,282 tons for the second, 65,807 for the third, 70,475 tons for the fourth year, and 73,839 tons for the fifth year.

Netherlands East Indies

Bulletin No. 49 of the Central Bureau of Statistics, Weltevreden, Java, has just been received, and from the mass of data relating to the export crops of the Netherlands East Indies contained therein, the facts and figures below have been selected.

For the year 1926, 922 estates supplied information regarding regular Hevea plantations, against 875 estates the year before. In addition, 14 estates reported plantings along the roads, and 5 reported scattered plantings. The total area of the estates reporting, came to 1,592,898 hectares (hectare = 2.45 acres), of which 507 estates with a total area of 748,174 hectares were in Java, and 415 estates with a total area of 844,724 hectares were in the Outer Provinces, which includes Sumatra. But only 32.4 per cent of the total acreage is planted, while the percentage planted in Hevea is 28 per cent, or 445,887 hectares, 194,720 hectares being in Java, 238,563 hectares in Sumatra, and 12,604 hectares in the other provinces. The Java area is fairly evenly divided between East and West Java, with only about 12 per cent in Central Java. Almost the entire Sumatra acreage, 202,596 hectares, is in East Coast Sumatra and Atjeh; this district is therefore the most important rubber growing center in the Dutch East Indies.

As a rule, the estates, particularly in Sumatra, plant Heavea only, but quite a number either grow other crops besides rubber or interplant tea or coffee, generally coffee, with the rubber. This practice is most frequently met with in East Java where only about 29.5 per cent of the area of the district is devoted to rubber exclusively.

The total rubber area in bearing came to 327,215 hectares—140,119 hectares in Java, and 187,096 hectares in Outer Provinces. The extent of the plantings undertaken in 1921 and later, aggregates 114,511 hectares, 49,219 hectares being in Java and 65,293 hectares in Outer Provinces. The areas planted in 1921 and succeeding years are given below:

	1921	1922	1923	1924	1925	1926
Java..	9,298	4,143	4,323	6,760	9,901	14,794
Outer Provinces...	9,419	7,560	6,460	10,984	12,362	18,107
Totals	18,717	12,103	10,783	17,744	22,263	32,901

The largest amount of new planting, therefore was undertaken in 1926. Over against these extensions must be put the land abandoned in 1926, the extent of which came to a total of 2,465 hectares, of which 1,377 hectares were for Java's account and 1,088 hectares for that of the Outer Provinces.

Production

The total output of Hevea rubber from the estates came to 122,831 metric tons, that is 51,794 tons from Java and 71,037 tons from the Outer Provinces. Native rubber outputs amounted to 120,454 tons wet, and 80,303 tons when allowance is made for dirt and moisture, thereby bringing the total net output of Hevea rubber for 1926 to 203,134 tons. It is estimated that during 1927 Java produced 55,002 tons, the Outer Provinces 75,451 tons and that the net dry output of native rubber came to about 93,000 tons, so that in all the Dutch colonies produced about 223,000 tons of rubber last year.

In calculating the yield per hectare, only estates with non-interplanted rubber could be considered. These estates produce about 75 per cent of the total estate rubber. The average yield for all Netherlands Indies estates worked out on this basis was 384 kilos per hectare; for Java alone, the figure was 389 kilos and for the Outer Provinces, 382 kilos. In 1925, the amounts were 355 kilos for all Netherlands East Indies, 359 kilos for Java, and 353 kilos for the Outer Provinces. There was, therefore, an improvement in the yields of estates during the year under consideration.

Latex

Latex exports were confined almost exclusively to Sumatra, only 500 kilos of the total 156,500 kilos shipped abroad having come from Java. In 1925 the shipments had come to 6,367,000 kilos, all from Sumatra. Most of the latex is converted into sprayed rubber and in this form 9,317,005 kilos were shipped from Sumatra in 1925 and 15,634,399 kilos in 1926. Java also exported 1,769,834 kilos of sprayed rubber in 1926.

Native Rubber

The area of native rubber in Sumatra and the other Outer Provinces is not known, although it must be considerable and it has been reported that in spite of the lower prices prevailing in the last two years extensive additions have been made to the areas already existing.

When native rubber is discussed Sumatra and Borneo are usually thought of and it may come as a surprise that in Java too the natives have been attracted to this crop and up to the end of 1926 had 1,920 hectares planted to rubber of which 1,373 hectares are in bearing. In the districts of Bantam and Batavia interest in the new crop seems to be particularly lively and the results obtained by those who have mature acreage have a very stimulating effect on the other natives.

The native output of Ficus rubber, all produced in the Outer Provinces, came to 1,862 tons in 1926 against 2,682 tons in 1925.

Forward Sales

Information regarding forward sales of the following firms has recently been published.

Rotterdam-Tapanoeli Cultuur My., out of crop 1928, 600,000 half kilos were sold at one guilder per half kilo.

Rubber My. Malabar, out of crop 1928, 66 tons, including 80 per cent standard sheet, at 1s. 5/8d. per pound, c. i. f.

Rubber Cultuur My. Kendeng Lemboe out of crop 1928, 700,000 half kilos at an average of 1.05 guilders per half kilo, f. o. b. Java.

Holland Deli Compagnie, out of crop 1928, 24 tons, including 80 per cent standard sheets, at 99 guilder cents per half kilo, c. i. f.

Linkungan Borneo Rubber My., out of crop 1928, 60 tons, including 80 per cent standard sheets, at 1s. 6¼d. per pound, c. i. f.

Packing Rubber

Owing to frequent complaints from American consumers, particularly the big tire factories, regarding the trouble and damage caused by dirt and splinters of wood penetrating rubber because of improper packing methods, the Board of the Netherlands East Indies Rubber Association recently circularized every exporter of rubber, urging that steps be taken to remedy the matter. The letter stated that complaints were now becoming so serious that the American manufacturers association was taking steps to put an end to the condition by requiring that rubber packed in chests be wrapped in sheets of rubber of the same kind. As a result producers were urged to wrap their rubber in the above manner, which also happens to be the method specially recommended by the Rubber Experiment Station.

Dr. Rutgers, Governor of Surinam

Dr. A. A. L. Rutgers, Director of Agriculture, Industry and Commerce in the Netherlands East Indies, has been appointed Governor of Surinam (Dutch Guiana).

The new governor of Surinam is a comparatively young man. He was born in 1885 in Amsterdam and is a son of the well known Professor F. L. Rutgers. In 1909, he obtained his doctor's degree in botany and zoology at the University of Utrecht.

In 1910 he went to Java and joined the Institute for Plant Diseases at Buitenzorg. He had in the meantime married the daughter of the then Governor of Surinam, and about the same time that he arrived in Java his father-in-law, too, came, as Governor-General of the Netherlands East Indies.

After seven years at the Botanical Gardens, he was appointed head of the A. V. R. O. S. Experiment Station, Medan, Sumatra. Seven years more he spent in this capacity, until in 1923, when but 37 years old, he was nominated Director of Agriculture.

EXPORTS OF AUTOMOBILE TIRES FROM THE United States to Peru increased from a value of $407,779 in 1926 to $432,683 in 1927, a gain of six per cent. A 12 per cent advance in value of casings was responsible for part of the increase.

Rubber Patents, Trade Marks and Designs

Machinery

United States

1,656,312 REMOVING METAL CORES. The apparatus provides a method of removing metal cores employed in the formation of hollow molded articles by the fusion of the cores without detriment to the goods. The article containing the mold core is supported in a high frequency induction furnace with a catch basin below into which the melted fusible metal runs.—C. D. Black, assignor to The B. F. Goodrich Co., both of Akron, O.

1,656,330 AUTOMATIC CLASSIFIER. This is designed to sort automatically, a succession of articles such as wound soft-rubber golf ball centers without dislodging the anchored end of the winding. Balls are delivered from a hopper to an automatic weighing device from which they pass into an inclined raceway having a series of hinged doors. These open automatically according to the registered weight of the approaching ball to permit the latter to drop through and be received by the proper one of a series of receptacles placed below.—W. D. Kmentt and H. E. Waner, Akron, O., assignors to The B. F. Goodrich Co., New York, N. Y.

1,656,870 TUBE VULCANIZER. This invention provides an apparatus for vulcanizing resilient inner tubes. It is so constructed that its circumference is adapted to be varied in order to permit the inner tube to become loosened and stripped from the apparatus without being subjected to objectionable distortion.—C. H. Roth, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,656,872 MATERIAL MARKER. Calendered fabrics are marked for identification by passing it over spaced disks which have been wet with colored marking fluid. This method provides for 3 degrees of freedom: 1, color or color combinations; 2, spacing of marking rollers and design of the mark; 3, changing or respacing the distances between the marking disks.—P. S. Shoaf, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,656,874 CONTINUOUS PROCESS VULCANIZER. This apparatus comprises a horizontal double jacketed heater from each end of which a vertical stand pipe rises. Down through one of these tires encased in molds descend by conveyer into the horizontal heater through which they are carried by the conveyer and elevated by the same means via the standpipe at the opposite end of the vulcanizer.—R. W. Snyder, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,657,014 CUSHION TIRE STRUCTURES. This invention permits the production structure comprising annular side sections and a central spacing ring rigidly connected to form a relatively strong base to which the legs of an arch shaped cushion tire may be secured.—F. R. Klaus, assignor to The American Welding & Mfg. Co., both of Warren, O.

1,657,818 MACHINE FOR WEFTLESS FABRIC. This invention permits the production of a weftless cord fabric having a reserve extensibility similar to that possessed by fabric of the light weft type. This result is accomplished without additional operations by forcing the cords into a matrix of sheet rubber by rapidly varying pressure causing them to assume sinuous form.—M. Castricum, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls, Mass.

1,657,829 CRIMPING TEXTILE MATERIAL. Individual cords such as are used in cord tire constructions are given any desired number of crimps per inch by passage between corrugated crimping rolls thus rendering the cords more elastic.—H. B. Hopson, Springfield, Mass.

1,657,846 TIRE MAKING MACHINE. By a quickly available tensioning and forming mechanism fabric is stretched and applied to the core. A readily opening device serves to apply the two beads uniformly and in correct position on the carcass and an efficient trimming mechanism efficiently trims the edges of the carcass, saving time and preventing possible injury to the beaded portion of the carcass.—W. C. Stevens, Summit, assignor to The Firestone Tire & Rubber Co., Akron, both in Ohio.

1,658,366 FABRIC RUBBERIZING APPARATUS. This chain of machines receives rolls of spliced fabrics at one end passing the goods successively through the processes of drying, compensating, frictioning, calender coating, cooling and rolled for further processing.—W. W. Benner, Cuyahoga Falls, and E. A. Hoener, Akron, assignors to The Firestone Tire & Rubber Co., Akron, all in O.

1,658,566 BATTERY JAR MOLDING PRESS. This press forms multiple cell battery jars and jars of uneven external surface, economically, accurately and rapidly without elaborate manipulation in the assembling of the pieces of stock from which the jar is molded. It also provides means for vulcanizing the box in the molding portion of the press.—F. J. MacDonald, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,656,246 STRETCH TESTER. R. P. Stevenson, assignor to Henry L. Scott Co., both of Providence, R. I.

1,656,251 VULCANIZER. H. R. Till, Chicago, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

1,656,340 TIRE TOOL. G. Samuell and C. T. Roberson, Dallas, Tex.

1,656,612 TIRE BUILDING CORE. K. O. B. Textorius, New York, N. Y.

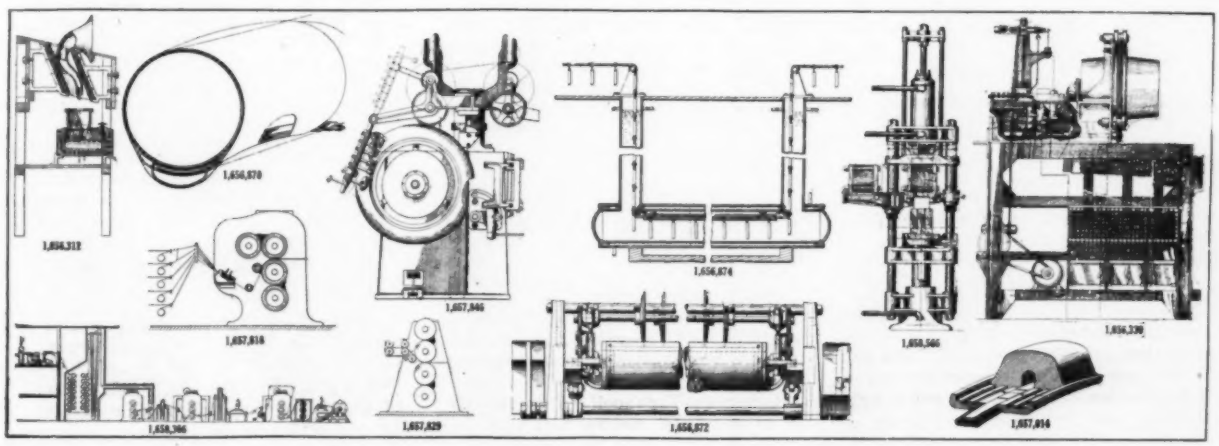
1,656,670 PRESSURE VALVE. S. Greenhouse, Akron, O.

1,656,742 TIRE CORE. C. E. Lawson, Utica, O.

1,656,873 CEMENTING DEVICE. R. W. Snyder, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,656,877 CEMENTING DEVICE. L. Wetmore, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,657,059 PRESS. M. H. Ballard, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.



Rubber Patents, Trade Marks and Designs

1,657,220 TIRE MOLD. P. L. Menjou, Paris, France.

1,657,267 TIRE. C. Macbeth, Birmingham, assignor to The Dunlop Rubber Co., Ltd., Regents Park, London, both in England.

1,657,296 SHOE PRESSING DEVICE. V. H. Bodle, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,657,398 MOLD. L. W. Hottel and H. M. Sturgeon, Erie, Pa.

1,657,835 CORE. G. L. Mather, Milwaukee, Wis., assignor to The Fisk Rubber Co., Chicopee Falls, Mass.

1,657,873 and 1,657,874 TUBE DEFLATING APPARATUS. J. Wahl and O. Melzer, Queens, assignors to A. Schrader's Son, Inc., Brooklyn, both in N. Y.

1,658,011 DIPPING FORM CLEANING APPARATUS. F. J. Unger, Akron, assignor to The Stardant Rubber Co., Kenmore, both in O.

1,658,313 DEFLATING APPARATUS. J. Wahl, Rosedale and O. Melzer, Hollis, assignors to A. Schrader's Son, Inc., Brooklyn, all in N. Y.

1,658,314 TIRE DEFLATING DEVICE. J. Wahl, Rosedale and O. Melzer, Hollis, assignors to A. Schrader's Son, Inc., Brooklyn, all in N. Y.

1,658,376 VULCANIZER. A. J. Fleiter, Akron, H. C. Bostwick, Kenmore, and T. A. Miller, Akron, assignors to The Akron Standard Mold Co., both in O.

1,658,564, 1,658,565 and 1,658,567 METHOD AND MACHINE FOR MOLDING. F. J. MacDonald, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,658,782 TIRE. W. C. Stevens, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

Dominion of Canada

277,029 TIRE BUILDER. The Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ontario, assignee of W. C. Stevens, Akron, O., U. S. A.

277,403 HEEL. The United Shoe Machinery Co. of Canada, Ltd., Montreal, Quebec, assignee of M. F. Fowler, Beverly, Mass., U. S. A., administratrix of the estate of A. B. Fowler, deceased, in his lifetime of Beverly.

277,558 TIRE BUILDER. The Goodyear Tire & Rubber Co., assignee of R. E. Jenkinson, both of Akron, O., U. S. A.

United Kingdom

280,228† OVERSHOE. Aktieselskabet Dansk Pressefabrik, 58 Kloverbladsgade, Copenhagen, Denmark.

280,640 TIRE. India Rubber, Gutta Percha & Telegraph Works Co., Ltd., 106 Cannon St., and W. L. Averv, of India Rubber, Gutta Percha & Telegraph Works, Silvertown, London.

280,973 COLLOIDAL DISPERSIONS. W. H. Whatmough, 119 Queen Victoria St., London.

Germany

455,194 POLISHING DRUM. Vereinigte Berlin-Frankfurter Gummiwaren-Fabriken, Berlin-Lichterfelde.

† Not yet accepted.

Design

Germany

1,014,997 RING CUTTING MACHINE. Hugo Dietzel, Rotermundstrasse 31, Hannover.

1,015,643 HOLDING DEVICE. Louis Schopper, Leipzig.

Process

United States

1,656,329 CABLE. E. G. Sievert and H. Svensson, Sundbyberg, near Stockholm, Sweden.

1,656,832 INTERLINER. R. Schäfer, assignor to M. Wiesenthal, both of Madgeburg, Germany.

1,657,052 INNER TUBE. I. J. Webster, Haverhill, Mass.

1,657,075 SHOE. D. H. Finberg, Brooklyn, N. Y., assignor to The Miller Rubber Co., Akron, O.

1,657,820 PRESSURE TUBE. W. A. Corlett, Kenmore, assignor to The Firestone Tire & Rubber Co., Akron, both in O.

1,657,830 WEFTLESS FABRIC. H. B. Hopson, Springfield, Mass.

1,658,008 AIR PILLOW. P. A. Raiche, assignor to Davol Rubber Co., both of Providence, R. I.

Dominion of Canada

277,402 HEEL. The United Shoe Machinery Co. of Canada Ltd., Montreal, Quebec, assignee of J. B. Hadaway, Swampscott, Mass., U. S. A.

277,404 SHOE. The United Shoe Machinery Co. of Canada Ltd., Montreal, Quebec, assignee of G. E. Warren, Swampscott, Mass., U. S. A.

Chemical

United States

1,656,614 CLOSURE FOR BOTTLES. This contains a fibrous material coated with rubber as a part of the sealing disk.—A. H. Warth, assignor to The Crown Cork & Seal Co., both of Baltimore, Md.

1,656,694 RECLAIMING PROCESS. This process comprises impregnating waste rubber with unpolymerized rubber distillate and thereafter treating the mass with a mineral acid to polymerize the distillate.—C. Danier, assignor to Syndicat Franco-Neerlandais, both of Paris, France.

1,656,737 INSULATING MATERIAL PROCESS. This comprises subjecting each of several compounds of rubber and sulphur in different proportions to a temperature above that required to produce vulcanization, and mixing the compounds.—A. R. Kemp, Westwood, N. J., assignor to Bell Telephone Laboratories, New York, N. Y.

1,656,832 TIRE INTERLINER. This consists of layers of different textile materials superposed by layers in a specified order.—R. Schafer, assignor to M. Wiesenthal, both of Magdeburg, Germany.

1,656,834 and 1,656,891 ACCELERATOR. An aldehyde derivative of the reaction product of an organic base and a mercapto compound containing a C-SH grouping.—W. Scott, assignor to The Rubber Service Laboratories Co., both of Akron, O.

1,657,081 PUNCTURE PROOF COMPOSITION. A dehydrated mixture of finely divided silica and alumina in major proportion and mica and soapstone in minor proportion, intimately mixed and in fine powdered form.—B. G. Harrington, Princeton, assignor of three-fourths to R. S. Mason, Eddyville, both in Ky.

1,657,171 RECLAIMING PROCESS. Ground waste rubber containing cotton is boiled with acid to remove and destroy the cotton which is washed free. The washed rubber is heated in a bath of kerosene from 120 degrees to 150 degrees C. until the maximum amount of impurities have been removed. Next separating the rubber from the kerosene, washing it with a suitable volatile fluid and drying the rubber.—G. J Miller, Douglass, Ariz.

1,657,380 PREPARING FATS. A solution of rubber in a volatile solvent is mixed with fat while in a molten state. The proportion of rubber being about one-half per cent of the fat.—K. Erslev, Nijmegen, Netherlands.

1,657,472 BONDING PROCESS. A coat of latex is applied to each of two surfaces, allowing them to dry, applying rubber cement to each surface and bringing them together to form a bond.—E. Hopkinson, New York, N. Y.

1,657,522 ACCELERATOR. A reaction product and a basic substituted guanidine having an imid group.—M. L. Weiss, Newark, N. J., assignor to Dovan Chemical Corp., New York, N. Y.

1,657,685 BELT DRESSING. A composition including rubber dissolved in a pine distillate and dextrose to which is added liquid styrax.—B. R. Phillips, Healdton, Okla.

1,658,476 FLUORESCENT PAINT. This comprises benzene, anthracene, rubber and a vulcanizer for rubber—L. J. Buttolph, Grantwood, assignor to Cooper Hewitt Electric Co., Hoboken, both in N. J.

Dominion of Canada

277,037 ADHESIVE. A refined concentrated stabilized rubber latex emulsion is reduced to a jelly-like mass and heated in the presence of solution of agar and sodium silicate causing it to be liquid while hot and jelly-like when cold.—Johnson & Johnson, Ltd., Montreal, assignee of G. S. Mathey, Elizabeth, N. J., U. S. A.

277,060 RECLAIMING PROCESS. Separation of fabric from waste bead cores by treating them with distillate from waste bead cores and hydrochloric acid.—Syndicat Franco-Neerlandais, assignee of C. Danier, both of Paris, France.

277,204 RUBBER. As electric insulation, an improved rubber product comprising natural rubber substantially free from rubber dispensing proteins.—Simplex Wire & Cable Co., Boston, assignee of C. R. Boggs, Waban, and J. L. Blake, Boston, all in Mass., U. S. A.

277,225 ACCELERATOR. A metallic salt of mercaptothiazol.—Goodyear Tire & Rubber Co., assignee of L. B. Sebrell

Rubber Patents, Trade Marks and Designs

and C. W. Bedford, all of Akron, O., U. S. A.

277,573 RUBBER-LIKE ARTICLE. A process which comprises dispersing a terpene, capable of reacting with sulphur, in water in particles of ultra fineness and coating such particles with proteid and treating the films with a reagent to prevent their rupture on coagulation of the film protected terpene particles.—The Research Inc., Boston, assignee of W. B. Pratt, Wellesley, both in Mass., U. S. A.

United Kingdom

280,661† ANTI-OXIDANT. A material conferring good aging qualities on rubber is produced by condensing equal proportions of alpha and beta naphthylamine with acetaldehyde.—British Dyestuffs Corp., C. J. T. Cronshaw and W. J. S. Naunton, all in Manchester.

281,223† PLASTIC COMPOSITIONS. Substances which increase the plasticity and which also release aldehydes are added to casein, albumen, etc. Rubber latex stabilized by the addition of a protective colloid may be sprayed into the mass.—O. Manfried, Brunn, Czecho-Slovakia.

281,490 HEAT INSULATING MATERIAL. A composite body impregnated on one or both surfaces with cementing material and such substances as water glass, gelatine or rubber solution.—C. O. Gossler, Hamburg, Germany.

281,616† PRESERVING RUBBER. The reaction products of phenols and amines are added to rubber compositions to improve their aging qualities.—Goodyear Tire & Rubber Co., assignees of J. Teppema, both of Akron, O., U. S. A.

Germany

453,628. ADDING COLLOID BODIES TO RUBBER. Felten & Guilleaume Carlswerk, A. G., Koln-Muhlheim.

453,900. VULCANIZING SHEET RUBBER. Phil. Penin Gummiwarenfabrik, A. G., Leipzig-Plagwitz.

454,104. SPONGE RUBBER. Belinde-Werke, A. G., Wandsbek.

General

United States

January 17, 1928*

1,656,157 NIPPLE. J. L. Correnti, Los Angeles, Calif.

1,656,298 COMBINATION GARMENT. G. L. Nickerson, assignor to The Warner Bros. Co., Inc., both of Bridgeport, Conn.

1,656,408 GOLF BALL. L. A. Young, Detroit, Mich.

1,656,462 BALL. G. H. Willis, assignor to J. L. Synder, both of Akron, O.

† Not yet accepted.

1,656,628 TRANSMISSION BELT. R. J. Gits, Chicago, Ill.

1,656,666 HORSE COLLAR. H. C. Detjen, Fredericksburg, Tex.

1,656,684 RAINCOAT. F. Tamborello, Milwaukee, Wis.

January 24, 1928*

1,656,953 WATERPROOFING COMPOUND. A. F. Owen, Jackson Heights, N. Y., assignor to The Naugatuck Chemical Co., Naugatuck, Conn.

1,657,021 NIPPLE. G. B. McMullen, assignor to Sanitary Nursing Bottle Co., Inc., both of Philadelphia, Pa.

1,657,023 TIRE INFLATOR. C. C. Mitchell and B. Gregory, assignors of ⅔ to C. E. Morrison, all of Vernon, Tex.

1,657,042 TIRE VALVE CAP. M. C. Schweinert, West Hoboken, N. J.; C. E. Whitney, M. Schweinert and The Farmers Loan & Trust Co., executors of said M. C. Schweinert, deceased.

1,657,050 NIPPLE STERILIZER. K. Walter, assignor to Dr. Med. Kaiser Kindersauger-Sterilisator Gesellschaft mit beschränkter Haftung, both of Berlin, Germany.

1,657,252 BATTERY. B. Ford, Philadelphia, Pa.

1,657,289 TIRE BOOT. L. H. Voss, Detroit, Mich.

1,657,300 SIDE DRIVING BELT. H. W. Delzell, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,657,390 SOUND ELIMINATOR. A. Halikman, New York, N. Y.

1,657,406 DEFLATION INDICATOR. J. F. McGuire, Kittanning, Pa.

1,657,427 GARTER. A. Witthaeger, Bristol, Conn.

January 31, 1928*

1,657,467 SWIMMING DEVICE. S. Gates, Braddock, assignor of one half to H. T. Zaslaff, Pittsburgh, both in Pa.

1,657,523 BATTERY BOX HANDLE. E. S. Boyer, Plainfield, N. J., assignor to American Hard Rubber Co., New York, N. Y.

1,657,535 ELASTIC WHEEL. S. C. Hatfield, Baltimore, Md.

1,657,667 TEAT CUP. C. E. Ellison, assignor to Aktiebolaget Manus, both of Norrkoping, Sweden.

1,657,686 SHOE TREAD. C. Roberts, Reigate, England.

1,657,701 HORSE COLLAR. I. J. Thomsen, Minden, Nebr.

1,657,743 WHEEL. George and Peter Christia, Detroit, Mich.

1,657,804 HEEL. N. R. Loockerman, Hampton, Va., assignor of one half to R. L. Loockerman, Jackson Heights, N. Y.

1,657,810 PLUG INSERTER. H. M. Watson, Omaha, Nebr.

1,657,946 WHEEL. M. W. Wallace, Rock Island, Ill.

1,657,984 VALVE. R. Wilson, Seanor, Pa.

February 7, 1928*

1,658,112 HORSE COLLAR. J. H. Wilson, Ottawa, Ont., Canada.

1,658,205 CONTAINER. F. J. MacDonald, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,658,233 NIPPLE. M. Falk, assignor to Bay State Collapsible Tube Co., both of Leominster, Mass.

1,658,312 WINDSHIELD CLEANER. J. Trimble, assignor to The Burke Machinery Co., both of Portland, Ore.

1,658,327 STETHOSCOPIC APPARATUS. H. F. Dodge, assignor to Western Electric Co., Inc., both of New York, N. Y.

1,658,426 TIRE. G. Buffo, Cordoba, Argentina.

1,658,623 TIRE RIM. E. E. Wittkopp, assignor of forty per cent to J. S. Szarat, both of Chicago, Ill.

1,658,632 TIRE. D. Ferrari, Boston, Mass.

1,658,646 TIRE FLAP. A. J. Michelin, Paris, assignor to Michelin et Cie., Clermont-Ferrand, both in France.

1,658,648 BELT. L. H. Nichols, Kenmore, O.

1,658,708 TIRE WHEEL. José Manuel de Aróstegui e Ybargüengoitia, Bilbao, Spain.

Reissue

16,807 PAVING BLOCK. L. J. D. Healy, Milwaukee, assignor to Wright Rubber Products Co., Racine, both in Wis. Filed Nov. 20, 1924. Serial No. 751,191. Original application filed Aug. 5, 1921, Serial No. 490,038. Continued and application filed Nov. 23, 1921, Serial No. 517,249. Original No. 1,437,304, dated Nov. 28, 1922.

16,873 RUBBER ARTICLES. E. Hopkinson, New York, and W. A. Gibbons, Little Neck, both in N. Y., assignors to Revere Rubber Co., Chelsea, Mass. Filed Feb. 2, 1926. Serial No. 85,602. Division of original No. 1,542,388, dated June 16, 1925, Serial No. 533,776, filed Feb. 3, 1922.

16,874 CONCENTRATED LATEX. E. Hopkinson, New York and W. A. Gibbons, Little Neck, both in N. Y., assignors to Revere Rubber Co., Chelsea, Mass. Filed Feb. 11, 1926. Serial No. 87,697. Division of original No. 1,542,388, dated June 16, 1925, Serial No. 533,776, filed Feb. 3, 1922.

Dominion of Canada

January 10, 1928

276,943 ARCH SUPPORT. H. R. Levick, Jr., Lexington, Ky., U. S. A.

276,962 PEN GRIP. A. E. Nelson, Dysart, Saskatchewan.

277,035 CUSHION TIRE. The Hibbert Pneumatic Cell Tyre Co., Ltd., assignee of E. Hibbert, both of Goulburn, New South Wales, Australia.

January 17, 1928

277,124 TIRE. P. P. Kostock, Chicago, Ill., U. S. A.

277,131 TIRE VALVE. G. A. Meek, Leon, Ia., U. S. A.

* Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

Rubber Patents, Trade Marks and Designs

277,165 REPAIR BAG. The Canadian Consolidated Rubber Co., Ltd., Montreal, Quebec, assignee of O. C. Wersen, Detroit, Mich., U. S. A.

277,170 BREAKER FABRIC. The Dominion Rubber Co., Ltd., Montreal, Quebec, assignee of W. K. Sawyer, Detroit, Mich., U. S. A.

277,192 TIRE BEAD. The National Standard Co., assignee of A. C. Hopkins, both of Niles, Mich., U. S. A.

277,193 TIRE BEAD. The National Standard Co., assignee of A. C. Hopkins, both of Niles, Mich., U. S. A.

January 24, 1928

277,262 MASSAGE APPARATUS. J. Freiss, Lausanne, Suisse.

277,296 TIRE. J. Powell, Carlton, Victoria, Australia.

277,302 TIRE. T. H. Rushton, Worksop, County of Nottingham, England.

277,343 SHOE. The Dominion Rubber Co., Ltd., Montreal, Quebec, assignee of F. P. Lundy, White Plains, New York, U. S. A.

January 31, 1928

277,428 NIPPLE. W. C. Ingram and E. J. Everest, co-inventors, both of Hackney Wick, County of London, England.

277,475 RUBBER SPRING. L. D. Hupe, East Templeton, Quebec.

277,518 ANTI PERSPIRATION DEVICE. L. Tompson, New York, N. Y., U. S. A.

277,519 MINING BOOT. J. Toole, Kirkland Lake, Ontario.

277,592 TIRE BOOT. J. H. Burrow and C. C. McSpadden, assignee of one half of the interest, both of Spokane, Wash., U. S. A.

United Kingdom

December 31, 1927

280,279 GAITER. J. W. Murray, 69 Roberts Ave., Kensington, Johannesburg, South Africa.

280,310 JOINT. C. R. Little, Primrose Hill St., Coventry.

280,325 SWITCH. V. A. Trier, 5 Dering St., New Bond St., London.

280,427 GOLF BAG. Leyland & Birmingham Rubber Co., Ltd., Golden Hill Works, Leyland, Lancashire, and J. J. Purdie, Dunavon, Lansdown Road, Sidcup, Kent.

January 11, 1928

280,477 COLLIERY TUB BUFFERS. T. Smith, Greenwood Cottages, Stocksfield-on-Tyne.

280,483 WASHER. F. C. Jones, Formosa St., Paddington, London.

280,600† CABLE. Felten & Guilleaume Carlswerk Akt. Ges., Mulheim, Cologne, Germany.

280,619 JOINT. Dorman, Long & Co., Ltd., 7 Zetland Road, Middlesborough, and M. R. Kirby, 59 Old Elvet, Durham.

280,636 RÖNIGEN RAY SHIELD. P. E. Harth, 5840 Pershing Ave., St. Louis, Mo., U. S. A.

280,669 TIRE. E. B. Killen, 27 Queen Victoria St., London.

280,700 HORSESHOE PAD. A. Whitham, 12 Lindley Terrace, Wyther Lane and H. Watkin, 65 Kirkstall Ave., both in Kirkstall, Leeds.

280,707 FOOTWEAR PATCH. J. P. Dunlop, 901 Shettleston Road, Glasgow.

280,715 TEAT CUP. F. Williams, 9 Kipling Ave., Bath.

280,760 DOOR STOP. C. R. Evans, 188 Ferndale Road and F. C. A. Watts, 186 Ferndale Road, both of Swindon, Wiltshire.

January 18, 1928

280,909† HAIR WAVING APPARATUS. G. E. Bjorkman, 3 Rue Lécluse, Paris, France.

280,950† SPLASH PREVENTER. R. A. M. Mauroux, 48 Avenue Edouard Vaillant, Boulogne-sur-Seine, France, assignee of R. E. Pottier, 46 Rue de Sablonville, Neuilly, Seine, France.

281,018 BATTERY. A. Lewis, 74 Sutherland Ave., Maida Vale, London.

281,046 BRUSH. A. W. Kanis, 66 Aldersgate St., London.

281,064 GOLF PRACTISING APPLIANCE. H. Egg, 33 Holmwood Rd., South Norwood, London.

281,099. GOLF TEE. E. Crowe, Barclays Bank Ltd., Banbury, Oxfordshire.

281,158 WHEEL. J. Powell, 46 Rathdown St., Carlton, Victoria, Australia.

281,228† LIQUID CONTAINER. E. Levoux, 11 Boulevard de la Madeleine, Paris, France.

281,229† WHEEL. Compagnie D'Applications Mecaniques, 42 Rue Franklin, Ivry-Port, Seine, France.

January 25, 1928

281,267† BUFFER. F. Kruckenberg, 1 Unter der Schanz, Heidelberg, Germany.

281,282† ARCH SUPPORTER. J. P. Wijnman, 376 Ceintuurbaan, Amsterdam, Holland.

281,321† HEEL. W. G. Rudolph, 4 Friedenstrasse, Hanover, Germany.

281,423 DRIVING BELT. A. Groves and S. Groves, 91 Barnsley Rd., Goldthorpe, near Rotherham, Yorkshire.

281,440 WIRE CASING COVER. M. H. Goldstone, 80 Promenade, Southport, Lancashire and A. W. Webb, 57 Burton Rd., Withington, Manchester.

281,453 TIRE. F. L. Rapson, Ottershaw Park, Chertsey, Surrey.

281,455 TIRE. G. C. Waterfield, 41 Hainault Ave., Westcliff-on-Sea.

281,457 TIRE. F. L. Rapson, Ottershaw Park, Chertsey, Surrey.

281,458 TIRE. F. L. Rapson, Ottershaw Park, Chertsey, Surrey.

281,500 TABLE FOR PLAYING GAMES. A. G. Eyles, 33 Blackbull Rd., Folkestone, Kent.

281,501 TIRE. J. Brown, Pit Bank, Scotswood-on-Tyne, S. M. Atkinson, 30 Montague St., and W. E. Scott, The Orchard, both in Lemington-on-Tyne.

281,519 SPRING SUSPENSION FOR VEHICLES. J. V. Martin, Garden City, Long Island, New York, U. S. A.

281,531 TIRE. H. Maul, 8 Klarastrasse Pasing, near Munich, Germany.

281,564 MUDGUARD. E. L. Ford and R. J. Rew, (trading as Airvac Ventilators), Honeypot Works, Honeypot Lane, Darlington.

281,565 OVERSOCK. F. Noetzel, 165 Hasselbrookstrasse, Hamburg, Germany.

†Not yet accepted.

Germany

454,443 UPHOLSTERING MATERIAL. Alfred Becher, Schorlemerallee 22, Berlin-Dahlem.

454,714 COLLAPSIBLE SYRINGE. Jean Brandt, Paris. Represented by O. Sack, Leipzig.

454,943 BRUSH. Emsa Werke, Rostock.

455,203 BLOCK BELT. Rudolph Roderwald, Menzelstrasse 9, Berlin-Grunewald.

Designs

Germany

1,014,131 HAIR CUTTING COLLAR. Adolph Deuschler, Bautzenerstrasse 16, Berlin W. 57.

1,014,397 FOREHEAD COOLER. Erich Sterzel, Launitzstrasse 22, Frankfurt a. M.

1,014,607 SPONGE RUBBER DOLL. Hannoversche Gummiwerke Excelsior, A. G., Hannover-Limmer.

1,015,008 COMBINATION TIRE. Carl Kleyer, Amalienstrasse 4, Karlsruhe.

1,015,042 CREPE SOLE. Ernst Honig, Weinstrasse 2, Munich.

1,015,070 GAITER. Otto Tillmann, Schwelm, i. W.

1,015,138 AIR CUSHION. J. C. Richter A. G., Eisenbahnstrasse 78, Leipzig-N.

1,015,144 VIOLIN CHIN REST. Belinde G. m. b. H., Berlin S. W. 68.

1,015,653 CUSHION. Hannoversche Gummiwerke Excelsior A. G., Hannover-Limmer.

1,015,789 METAL PROTECTED HOSE. Paersch & Kerstan, Belle-Alliance Strasse 3, Berlin S. W. 61.

1,016,174 HARD RUBBER COVER. Berta Boitin, nee v. Brockdorff, Schulstrasse 3, Potsdam.

1,016,211 TUBE. Gesellschaft fur Automobil-Bedarfsartikel m. b. H., Berlin S. W. 11.

1,016,394 HOLLOW GOODS. Jlugel & Polter, Leipzig-Plagwitz.

1,016,557 GOLF BALL. Lick-Paramount, Ritterstrasse 70, Berlin S. W. 68.

1,016,563 BATHING BAG. Hoy & Co., Meisznerstrasse 8, Hamburg 19.

1,016,569 HEEL. Kurt Graser, Luckenwalde.

SEEKING CHANGELESS ORGANIC DYES

While in the manufacture of multicolored rubber products much progress has been made in providing a variety of fine opaque pigments of marked stability, regret is expressed that there is yet unavailable a fair range of organic dye colors that will not change in shade when heated with sulphur. It is said that many extensive uses could be found for such tinctorial ingredients.

Rubber Patents, Trade Marks and Designs

Trade Marks

United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section (1) (b) are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the later act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

January 17, 1928, Act of February 20, 1905

237,649 Representation of a shoe sole on which are superimposed the words: "DOCTOR'S-CHOICE"—children's shoes of leather, rubber, etc. Nature Footwear Corp., Brewer, Me.

237,689 HOL-HI — golf balls. Wilson-Western Sporting Goods Co., Chicago, Ill.

237,690 DURA-DIST—golf balls. Wilson-Western Sporting Goods Co., Chicago, Ill.

237,710 WHIPPET—pneumatic bicycle tires. The Shelby Cycle Co., Shelby, O.

237,740 PNEU-TUFT—pneumatic cushions. William J. Voit, doing business as W. J. Voit Rubber Co., Los Angeles, Calif.

237,778 ALL SPORTS—shoes with Vulcanized rubber soles. Endicott Johnson Corp., Endicott, N. Y.

237,816 Representation of a portion of fabric on which is printed a waving blue line—elastic fabric. J. R. Kendrick Co., Inc., Philadelphia, Pa.

237,823 "K-N"—fountain pens, pencils, erasers, etc. C. R. Keeran, assignor to Keeran Products Co., Chicago, Ill.

January 24, 1928, Act of February 20, 1905

237,919 Shield the lower portion of which contains the word: "PARILON"—shoes of rubber and leather, raincoats, hosiery, etc. W. E. White, Inc., New York, N. Y.

237,929 ROYAL — hard rubber combs. American Hard Rubber Co., Hempstead and New York, N. Y.

237,975 ZIPANT—capes, baby pants, bathing caps and waterproof aprons. Rubberized Sheeting & Specialty Co., Inc., New York, N. Y.

238,008 XL—boots, shoes, overshoes, soles and heels. Hood Rubber Co., Watertown, Mass.

238,061 "CELINOL"—rubber lined conducting hose. The B. F. Goodrich Co., New York, N. Y.

238,066 Color mark shown on edge of goods in yellow, red and white—patches for pneumatic inner tubes for tires. Beter Products Co., Inc., Dallas, Tex.

238,068 Representation of a brush with red band encircling the periphery of the upper end of the handle—shaving brushes. Rubber & Celluloid Products Co., Newark, N. J.

January 31, 1928, Act of February 20, 1905

238,164 PRO-TEK-A-TUBE—tire or rim flaps for pneumatic tires. Eno Rubber Corp., Los Angeles, Calif.

238,209 Representation of a tire at the sides of which are attached a pair of wings and superimposed across the front the words: "TIRE LIFE"—puncture sealing compound for tires. G. W. Broadbridge, Corunna, Mich.

February 7, 1928, Act of February 20, 1905

238,462 BLUE RIDGE—tires and tubes. Bedford Tire & Rubber Co., Inc., Bedford, Va.

Dominion of Canada

Registered

January 24, 1928

43,147 "RE-LY-ON"—footwear. Dominion Rubber Co., Ltd., Montreal, Quebec.

January 31, 1928

43,179 "MAXPAR" — golf ball. Dunlop Tire & Rubber Goods Co., Ltd. Toronto, Ont.

United Kingdom

January 4, 1928

481,814 Portion of a tire on the front of which is the representation of a sailing boat with the letter: "P" superimposed on the sail—tire repair outfits. The Poppe Rubber & Tyre Co., 108-116, Sherland Rd., Twickenham, Middlesex.

485,827 ALLIANCE—soles and heels. Sussex Rubber Co., Ltd., 32, Houndsditch, London, E. 1.

January 11, 1928

484,830 "RUBLIN" — boots and shoes. Naamlooze Vennootschap Vereenigde Nederlandsche Rubberfabrieken, Dunolaan A. 163, Heveadorp, Province of Gelderland, Holland (Bayly & Berthon, 18, Fulham Pl., Paddington, London, W. 2).

486,208 "CRITERION CORDS" — tires. The Marsham Tyre Co., Ltd., 48, Charlotte St., Tottenham Court Rd., London, W. 1.

January 18, 1928

483,274 "TORERO" — engine and machine packing and jointing. The Beldam Packing & Rubber Co., Ltd., 16, Gracechurch St., London, E. C. 3.

485,379 Square containing the words: "PERFECTION", "Boswov" and "ORIGINAL"—machine belting. Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A. (J. A. T. Caton & Son, Monument Station Bldgs., London, E. C. 4.)

Designs

United States

74,251 NURSING BOTTLE. R. W. Bettoli, San Rafael, assignor of one-third to H. M. Peattie, San Rafael, and one-third to J. E. Trabucco, San Francisco, both in Calif.

74,252 SHOE SOLE. G. W. Blair, assignor to Mishawaka Rubber & Woolen Mfg. Co., both of Mishawaka, Ind.

74,262 TIRE. R. W. Grant, Clifton, N. J. assignor to Bedford Tire & Rubber Co., Bedford, Va.

74,363 TIRE. D. H. Fenton, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls, both in Mass.

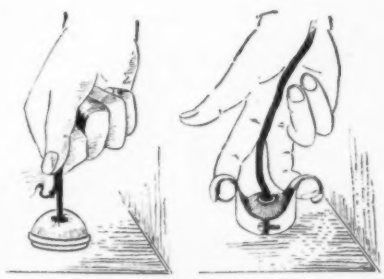
74,372 TIRE. Gustave Hubach, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls, both in Mass.

Dominion of Canada

7,829 HOT WATER BOTTLE. Chas. Macintosh & Co., Ltd., 2, Cambridge St. Manchester, England.

USEFUL ELECTRIC ATTACHMENT

The Pull-A-Plug is a useful electric attachment which is readily slipped on to standard plug caps of any size, style or make and is quickly fastened by tightening the screw. It also serves as



Pull-A-Plug

a shield, protecting the plug cap from breakage, eliminating frayed wires, burnt out fuses, etc. It will not slip off and requires no rewiring. The two curved arms form convenient grips for the fingers. The device is finished in black Japan to match the hard rubber plug. Pull-A-Plug is manufactured by the Ren Mfg. Co., Winchester, Mass.

PANAMA CITY EXPORTS

Department of Commerce has prepared the following table showing the declared exports from Panama City, by quantity and value, of balata, perillo gum, and crude rubber in 1926 and 1927.

	1926		1927	
	Pounds		Pounds	
Balata	10,836	$4,623	9,961	$3,964
Perillo gum	.....	.....	1,115	363
Crude rubber	44,528	20,022	39,373	8,873

SCRAP RUBBER EXPORTS FROM PRINCE Edward Island to the United States in 1927 amounted to 30,000 pounds.

Reclaimed Rubber Market

Reclaiming plants generally are being operated at not much below their capacity outputs to meet the steady demand. Rubber manufacturers are not only highly appreciative of the technical value of the various reclaim grades as adjurants to rubber but are coming to realize the stability of the prices of every grade. This is a most important factor and one not characteristic of crude rubber.

Rubber manufacturers are now getting reclaim at lower prices than before the recent tire scrap advance of several dollars a ton. In other words tire reclaim has actually declined independently of scrap price movement thus demonstrating price stability under efficient reclaiming management.

New York Quotations

February 24, 1928

	Specific Gravity	Price per Pound
Auto Tire		
Black	1.21	$0.08 @ $0.08½
Black, washed	1.18	.10 @ .10½
Black selected tires	1.18	.07½ @ .08¼
Dark gray	1.35	.11½ @ .12
Light gray	1.38	.13 @ .13¼
White	1.40	.15 @ .15½
High Tensile		
Super-reclaim, No. 1 black	1.20	.16 @ .16½
No. 2 black	1.20	.13½ @ .14
High tensile red	1.20	.15¾ @ .16¼
Shoe		
Unwashed	1.60	.08 @ .08¼
Washed	1.50	.10¼ @ .10¾
Tube		
No. 1	1.00	.16 @ .16½
No. 2	1.10	.13½ @ .14
Miscellaneous		
Red	1.35	.14 @ .14½
Truck tire, heavy gravity	1.55	.07½ @ .07¾
Truck tire, light gravity	1.40	.08 @ .08¼
Mechanical blends	1.60	.07 @ .08

World Rubber Production—Net Exports

Long Tons—1927

	August	September	October	November	December	January 1928
British Malaya	13,266	17,740	14,045	8,417	14,320	11,113
Ceylon	5,357	4,911	5,245	4,464	4,130	4,352
India and Burma	688	479	802	1,277	1,395	....
Sarawak	1,133	645	721	1,241	946	842
British Borneo	*500	*500	*500	*500	*500	*500
Siam	546	498	452	600	664	525
Java and Madura	4,355	3,635	3,810	4,127	5,763	....
Sumatra East Coast	6,682	5,957	7,755	6,587	7,878	....
Other N. E. Indies	12,440	9,853	13,633	14,395	13,438	....
French Indo-China	716	497	775	683	1,191	720
Amazon Valley	2,004	2,474	2,704	2,547	3,321	2,273
Other America	102	176	*100	*100	*100	....
Mexican Guayule	348	463	455	496	342	....
Africa	519	574	*600	*600	*600	....
Totals	48,656	48,402	51,597	46,034	54,588	....

*Estimate.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Absorption—Net Imports

Long Tons—1927

	July	August	September	October	November	December
Australia	900	650	772	908	836	1,242
Belgium	429	604	552	465	749	784
Canada	2,104	2,013	1,850	1,790	1,916	2,302
Czechoslovakia	236	123	272	363	....	....
Denmark	43	56	50	37	82	36
Finland	43	38	123	132	67	87
France	2,384	2,795	1,956	3,479	3,661	4,696
Germany	2,899	3,119	2,891	4,202	4,209	3,108
Italy	1,007	1,274	684	1,021	1,167	....
Japan	1,505	1,970	2,025	1,966	1,575	....
Netherlands	66	—63	—33	156	298	—202
Norway	39	46	95	42	52	....
Russia	415	386	518	1,075	1,312	1,443
Spain	177	138	155	153	246	....
Sweden	102	172	183	190	273	....
United Kingdom	1,116	3,463	7,800	5,888	1,687	309
United States	35,719	31,001	29,801	27,671	36,123	28,082
United States (Guayule)	397	348	463	455	496	342
Totals	49,581	48,133	50,157	49,993	....	....

—Minus quantity; excess of reexports over imports.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

SIMPLIFIED TIRE PRACTICE

As a result of cooperation between the manufacturers of automobile tires and the Rubber Association of America, a tentative simplified practice recommendation was drafted on January 16, 1928, for the consideration of the automobile manufacturers. The recommendation was given consideration by the Society of Automotive Engineers in Detroit, Mich., on Jan. 25, when an Advisory Committee composed of representatives of the automobile manufacturers approved the first step suggested, namely, the reduction in the number of balloon tire sizes from 24 to 16. It was deemed premature to move for the adoption of the second step, namely, a further reduction to 7 sizes, inasmuch as the second step is based upon the 20-inch wheel diameter, a step which does not clearly recognize present tendencies in the industry. The Advisory Committee recommended that the first revision table be revised as follows:

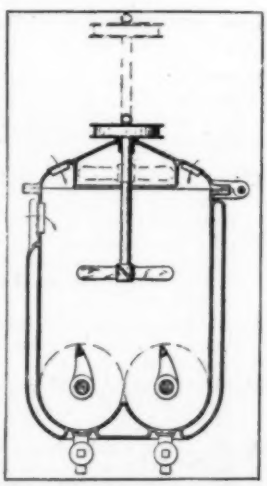
(1) The tire size designation shall include the tire diameter and section, and the rim diameter. (2) In naming the tire size, the tire diameter should be the wheel diameter plus twice the tire section. (3) The present practice of marking on the tire, the rim size on which the tire is recommended for use, is to be continued. (4) The present practice of measuring tire sizes on their respective rim sections is to be continued. (5) In manufacturing practice the Rubber Association of America should, in measuring, hold as near as possible to the section sizes. (6) The 7.00 section on the 18-inch wheel should be dropped and the 5.25 on the 18 inch rim substituted. (7) The 4.75 section on the 20 inch wheel should be dropped and the 5.25 on the 19 inch rim substituted. (8) The rim widths recommended by the Rubber Association of America are favorably considered but should be further studied by the Tire & Rim Association of America.

It was recommended by the Advisory Committee that the first revision table, as revised, be adopted. At a date to be announced later, the manufacturers of automobiles will be requested to submit their opinions regarding this tentative recommendation and ultimately the recommendation will be referred to a general conference of all interested, convened under the auspices of the Division of Simplified Practice, for acceptance.

GERMAN CEMENT CHURN

A recent German invention relating to a water jacketed rubber cement churn is here represented in vertical section.

The machine has a special device which agitates the solvent or diluent liquid poured onto the plastic mass in the trough and while it accelerates solution or dilution, permits production of very dilute solutions in the same machine in which the original mass was first rendered plastic. The machine, which may be used for making rubber solution, has a tank that is deeper than usual, surrounded by a cooling jacket. Mixing and kneading blades are arranged on two horizontal shafts and revolve in suitably molded compartments in the bottom of the tank. From the top of the tank, a vertical shaft with agitating blades descends through the cover, packed by means of stuffing boxes. This shaft is operated by a pulley so arranged that its operation is not interfered with when the cover is opened for charging the material.—Fritz Kempter, Stuttgart, Germany.



Kempter Churn

Review of the Crude Rubber Market

The Rubber Exchange of New York, Inc.

TRANSACTIONS on the Rubber Exchange between January 21 and February 21, inclusive, were 31,470 lots equivalent to 78,675 tons valued approximately at $56,250,000. The dullness of the market of the previous month continued for only two days at the beginning of the period under review. On January 26 a liquidating movement began which sent the active deliveries down 40 to 60 points. This was but the beginning of a strong decline which carried the prices of all positions below 29 cents on February 21.

The general decline was accelerated in consequence of a report from London that the British Government had asked the Civil Research Committee to investigate the operation of the Stevenson restriction act. The inference drawn from this by the traders was that it is the forerunner of the abandonment of the policy of restriction or that the pivotal price will be reduced to 15 d., because the Civil Research Committee is known to be in sympathy with the British Board of Trade and the latter body is definitely opposed to the policy of restriction.

On January 31 official announcement was made by the British Colonial Office that there will be no change in the restriction regulations for the current quarter. The exports from British controlled estates will therefore remain at 60 per cent of standard production. This announcement was anticipated and had no effect on the market situation which rapidly developed the rapid decline mentioned. Buying interest on the part of factories was notably small throughout the month waiting for the ultimate low level to develop.

It was remarked by F. R. Henderson, president of the Exchange, that regardless of how the Civil Research Committee recommends it will require some time before the Stevenson act can be changed.

During the week ended January 27 only a small amount of business was passing but considerable activity developed at lower price levels before the close of the week. The main contributing factor in lowering prices was the announcement of the interest of the so-called rubber pool in the Webb-Pomerene bill now before Congress. The intention of the pool to stabilize prices caused considerable long position to be liquidated because a stabilized market would show no prospective sharp upturns.

A second contributing cause for the decline was a disappointing factory demand. Factories undoubtedly were encouraged to withhold purchasing and evidently believed, by reason of the activities of the pool that they would be able to buy their rubber cheaper.

The week ended February 4 showed prices fairly steady until the break of a cent to a cent and a half about mid-week. Pool support was noted on the last day of the week and halted further decline.

HIGH AND LOW CLOSING PRICES, CENTS PER POUND

Monthly Futures 1928	Jan. 28 High	Jan. 28 Low	Feb. 4 High	Feb. 4 Low	Feb. 11 High	Feb. 11 Low	Feb. 18 High	Feb. 18 Low	Feb. 25 High	Feb. 25 Low
January	40 0	39.8	....	....	....	....	....	....	....	....
February	40.0	38.9	38.6	36.7	36.2	34.0	32.0	30.5	28.5	28.3
March	40.2	39.3	38.8	37.0	37.0	33 8	32.2	30.6	28.4	28.4
April	40.5	39.5	38.8	37.2	37.4	34.0	32 5	30.9	28.9	28.7
May	40.7	39.7	39.2	37.4	37.8	34.8	32.8	31.3	....	....
June	40.9	40.1	39.4	37.6	38.0	34 4	32.9	31.4	29.2	28.9
July	41.1	40.2	39.7	37.8	38.2	34.6	33 0	31.4	....	....
August	41.2	40.3	39.8	38.1	38.3	34 7	33.1	31.5	29.3	29.0
September	41.4	40.4	39.9	38.3	38.1	34 9	33.2	31.5	....	....
October	41.5	40.6	40.1	38.2	38.5	35.0	33.2	31.5	29.2	29.2
November	41.6	40.7	40.2	38.5	38.7	35.2	33.3	31.5	29.4	29.1
December	41.8	40.9	40.4	38.7	38.9	35.4	33.3	31.5	....	....
1929										
January	....	....	39.9	38.9	39.1	35.5	33.4	31.7		

The week terminated February 11 was one of violent fluctuations with closing prices showing a loss of nearly 4 cents a pound compared with the previous week. On February 9, 2,671 lots, or 6,577½ tons were traded in. This was a new record in trading volume. The principal cause for the heavy selling both here and in London was the announcement of the British Premier that a special committee will make recommendations in the matter of continuing or discontinuing the Stevenson restriction law.

The market for the week ended February 18 was under constant selling pressure and lower prices resulted in all positions. The sentiment was reported general in both London and New York that the restriction law is destined to be abolished and if is only a question of what notice may be given to producers. It is rumored that renewal of efforts are being made to induce the Dutch to join the British growers in a final attempt to save the restriction scheme. In the opinion of New York market authorities agreement by the Dutch to join in the British plan of restriction is not likely to be realized at this juncture.

In commenting on the rapid decline of rubber prices the past month, F. R. Henderson, president of the Exchange, in his weekly market letter of February 11 remarked as follows:

"The Exchange has functioned in a most orderly manner, and with each severe drop, the saving reactions have taken place, due to speculative covering and this has undoubtedly circumvented what might otherwise have been a panicky condition."

Hugh T. Keating, of New York, and Aage Bendixen, of A. Bendixen & Co., Ltd., London, England, have become members of the Exchange.

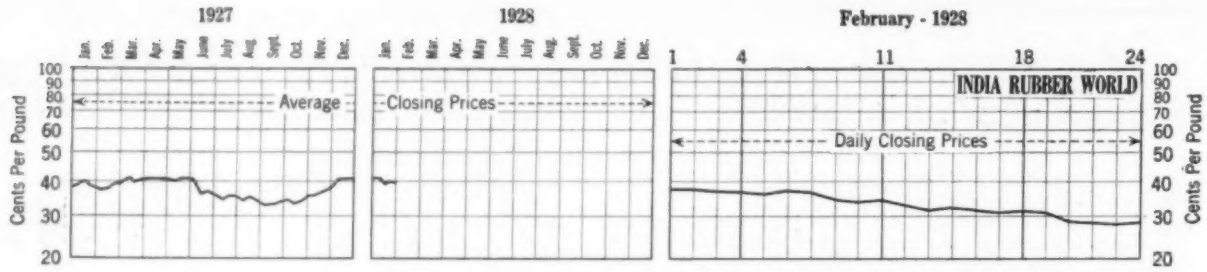
The seat of Alfred T. Martin of Bartel, Frazier & Co., Chicago, was sold to Lewis D. Raabin, of Henry Hantz & Co., for $6,500. This price is unchanged from that of the previous sale.

The Rubber Exchange Prices

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLOSING PRICES—CENTS PER POUND

	January 23	24	25	26	27	28	30	31	1	2	3	4	6	7	8	9	10	11	February 13*	14	15	16	17	18	20	21	22*	23	24	25
1928																														
Jan.	39.9	40.0	39.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	...	....	....	....
Feb.	39.8	40,0	39.8	39.4	39.0	38.9	38.4	38.6	37.4	37.5	37.0	36.7	36.2	36.6	36.4	34.0	33.7	34.0	....	31.2	32.0	31.2	30.5	30.9	30.5	28.4	...	28.5	....	....
Mar.	40.2	40.2	40.1	39.5	39.4	39.3	38.7	38.8	37.6	37.8	37.3	37.0	36.5	37.0	36.7	34.4	33.8	34.2	....	31.4	32.2	31.4	30.6	31.1	30.7	28.5	...	28.8	28.2	28.3
Apr.	40.5	40.5	40.3	39.8	39.6	39.5	38.8	38.8	37.8	38.1	37.4	37.2	36.7	37.4	37.0	34.6	34.0	34.6	....	31.7	32.5	31.7	30.9	31.5	31.0	28.6	...	29.3	28.3	28.5
May	40.7	40.7	40.6	40.1	39.8	39.7	39.2	39.1	37.9	38.3	37.5	37.4	37.1	37.8	37.5	34.9	34.3	34.8	....	31.7	32.8	32.0	31.3	31.8	31.0	28.7	...	29.3	28.4	28.8
June	40.9	40.9	40.8	40.3	40.1	40.0	39.4	39.4	38.2	38.6	37.9	37.6	37.3	38.0	37.6	35.0	34.4	35.2	....	31.9	32.9	32.1	31.4	31.8	31.1	28.8	...	29.3	28.5	28.8
July	41.1	41.1	40.9	40.5	40.3	40.2	39.6	39.7	38.4	38.9	38.1	37.8	37.5	38.2	37.8	35.1	34.6	35.2	....	32.0	33.0	32.1	31.4	31.8	31.2	28.8	...	29.4	28.5	28.9
Aug.	41.2	41.2	41.0	40.6	40.4	40.3	39.8	39.8	38.6	39.0	38.3	38.1	37.7	38.3	37.9	35.4	34.7	35.4	....	32.1	33.1	32.2	31.5	31.9	31.2	28.9	...	29.4	28.6	29.0
Sep.	41.4	41.3	41.1	40.6	40.5	40.4	39.9	39.9	38.7	39.1	38.5	38.3	37.9	38.4	38.1	35.6	34.9	35.5	....	32.1	33.2	32.2	31.5	31.9	31.3	28.9	...	29.4	28.6	29.0
Oct.	41.5	41.3	41.3	40.7	40.7	40.6	40.0	40.1	39.0	39.4	38.7	38.2	38.0	38.5	38.2	35.8	35.0	35.6	....	32.2	33.2	32.2	31.5	31.9	31.4	28.9	...	29.4	28.7	29.1
Nov.	41.6	41.5	41.4	40.8	40.8	40.7	40.2	40.2	39.2	39.6	38.9	38.5	38.2	38.7	38.4	35.9	35.2	35.8	....	32.3	33.3	32.3	31.5	31.9	31.5	28.9	...	29.4	28.7	29.1
Dec.	41.8	41.6	41.5	41.0	41.0	40.9	40.4	40.4	39.3	39.7	39.1	38.7	38.4	38.9	38.6	36.0	35.4	36.0	....	32.3	33.3	32.3	31.5	32.0	31.6	28.9	...	29.3	28.7	29.1
1929																														
Jan.	....	....	....	....	....	....	....	....	39.5	39.9	39.3	38.9	38.5	39.1	38.8	36.2	35.5	36.1	....	32.5	33.4	32.4	31.7	32.1	31.6	29.0	...	29.4	28.8	29.2

* Holiday.



Ratio Graph of New York Closing Prices of Spot Ribbed Smoked Sheets

New York Outside Market

Trade in the New York outside market for January was dull at the steady level of 40 cents for spot. The condition with regard to prices changed radically and was marked by a drop of 10 cents a pound in the spot closing prices between the first and the 24th of February. Under these conditions factory buying diminished to the vanishing point waiting for the bottom of the decline to be reached. The progress of the market is indicated by the following summary by weeks.

For the week ended January 28 the market showed very few signs of life and after maintaining a fairly steady undertone for the first three days it weakened gradually and sold finally at about 1 cent lower in all positions. There was little actual support except by shorts covering for the week end. Factory business was very light. Those that bid slightly under the market were content when their offers were not accepted.

The market of the week closed February 4 showed some active tendencies and rather wide fluctuations. Opening steady with normal prices around 39¼ cents the price fell off on Wednesday and dealers and operators disregarded the London market and sold rubber. Prices broke sharply about 1 cent to 1½ cents with fair factory business for April-June delivery, and all cheap offerings. The market finally quieted down with no further factory buying.

The week ended February 11 was very exciting with tremendous trading on the Exchange owing to the severe drop caused by the action of the British Premier in connection with the investigation of the restriction act. The factories stood by to await further information and dealing in actual rubber was thus very limited for factory consumption.

During the week closed February 18 lack of buying by the factories kept the market from showing any improvement and the trade generally considered lower prices would be reached for all positions and grades. A distinct upward reaction was manifest in the market transactions of February 25 when small gains were noted in all positions. Spot on that date was 28¾ cents.

Paras declined with plantations and were quiet and neglected. Balatas were very dull with no inquiries and supplies available.

Importations of all grades in January were 46,243 tons, compared with 45,736 tons one year ago. Plantation arrivals for January were 43,668 tons compared with 42,646 tons one year ago. Arrivals of all grades February 1 to 15 inclusive were 13,218 tons. Estimated arrivals for the full month of February, 31,000 tons.

RUBBER AFLOAT TO THE UNITED STATES

Week ended 1928	British Malaya	Ceylon	Netherland Indies	London and Liverpool	Totals
January 28	4,469	420	975	212	6,076
February 4	3,733	948	1,779	668	7,128
February 11	4,994	733	1,089	1,155	7,971
February 18	4,717	1,256	1,469	1,147	8,589

London

The February market began steady, quiet and featureless but soon developed a nervous condition and a tendency to liquidation appeared when declines of ⅛ and ¼ d. set in. While small advances in prices were noted early in February the market as a rule was weak and irregular during the first three weeks of the month. The most severe break occurred on the 9th when the drop was 2¼ d. on all positions. This was followed by a brighter tone but the situation again turned weak and uncertain.

Interesting comments on the market situation are made as follows by London rubber traders.

The Colonial Secretary of the British Government announced last year that no change would take place in the restriction scheme prior to February 1, and as that date approaches rumor mongers are busy with all sorts of possible changes in the Stevenson scheme. Deductions are made on various premises, according to Zorn & Leigh-Hunt, Stock Exchange Brokers, "with amusing if somewhat unscrupulous ingenuity," and certain critics have even gone so far as to declare that the present movement for the amalgamation of rubber estates into larger units is an implicit admission by directors that the complete abandonment of restriction is about to take place.

"The Statist" commented as follows on the market and American consumption:

Whether it be due to disappointment with the American consumption estimate for December or disorganization caused by the flood of Thameside warehouses, or anticipation that the restriction regulations will be altered, the fact remains that the crude rubber market has failed to maintain its appearance of cheerfulness in face of accumulating evidence of constantly growing Dutch production and use of reclaimed rubber.

It is difficult to escape the thought that scientific economy in the use of rubber in tire manufacturing is being increasingly practiced.

New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

Plantations	January, 1928								February, 1928														
Sheet	23	24	25	26	27	28	30	31	1	2	3	4	6	7	8	9	10	11	*13	14	15	16	17	18
Ribbed smoked	40	39½	39½	39½	39½	39¼	38⅝	38⅝	37⅝	37⅝	37⅜	37⅜	36½	37½	36¾	34½	33⅞	34½	....	31⅜	32½	31½	30¾	31¼
Crepe																								
First latex	40⅛	40⅛	40	39⅜	39⅜	39½	38¼	38¼	37¼	37¼	37¼	37⅜	36⅝	37¼	36⅞	34⅝	34	34½	....	31½	32½	31⅝	31	31½
No. 2 blanket	38	38	37⅛	37½	37⅛	37½	36⅞	36⅞	35⅞	36⅛	35⅜	35½	34¾	35	35⅛	32¾	32⅛	34¼	....	29⅝	30¾	30¾	29⅜	29⅞
No. 3 blanket	37⅛	37½	37⅛	36⅜	36½	36½	36½	36¼	35¼	35½	34⅜	34½	34½	34⅛	34⅛	32⅛	31½	32½	....	29¼	30⅛	30	28⅜	29⅛
No. 4 blanket	36⅜	36⅜	36⅜	36⅛	36⅛	36⅛	35⅜	35⅜	34⅜	35	34½	33⅞	33½	33⅜	33⅜	31⅜	31	31½	....	28⅞	29⅝	29⅜	28½	28⅜
Thin clean brown	37⅛	37⅛	37⅛	36⅞	36½	36½	36½	36½	35½	35½	34⅜	34½	34	34⅜	34	31⅞	31⅛	30⅞	....	29	30	29⅜	28½	29⅛
Rolled brown	33⅜	33⅜	33	32⅜	32⅛	32⅛	31⅜	31⅜	30⅜	30⅜	30⅜	30⅛	30	30⅛	30⅛	28¼	27½	27⅜	....	25⅞	26⅝	26⅜	24⅜	25
Off latex	39⅜	39⅜	39⅜	39½	39	39	38⅜	38½	37½	37½	37⅛	37	36⅜	37	36½	34⅜	33⅝	34⅜	....	31⅛	32⅛	31⅜	30⅝	31⅛

*Holiday.

Singapore

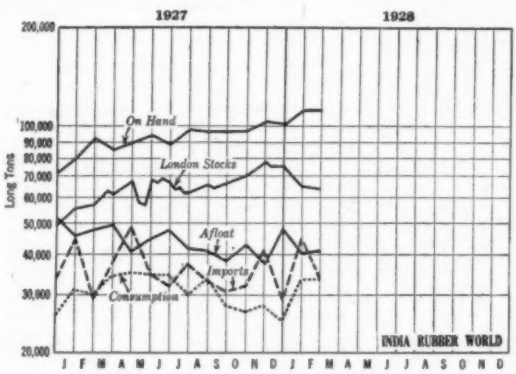
The market in Singapore varied in no essential from that in London which it followed closely in irregular and weak tone with rapid and alarming declines on all positions.

Moulsdale & Shaw in their market letter of February 10 referring to the work of the committee investigating the operation of the restriction act remarks as follows:

The report of the Government Committee must of necessity take a long period to compile and many months will elapse before it is made known and consequently the market will remain in a state of uncertainty and it is obvious that manufacturers, dealers and others will trade very warily. In the meantime trade orders have been good, factories taking full advantage of the lower prices now ruling. New York, having recovered from the first shock of the announcement, sent some unexpected orders here which together with home trade orders had a temporary steady effect.

Imports, Consumption and Stocks

The accompanying graph covers the crude rubber supply consumption and stocks for 1925, 1926, 1927 and the first two months of 1928. Stocks on hand advanced to 110,000 tons in January and are estimated to retain that level during February. Stocks afloat maintained approximately the same level in January and February



U. S. Imports, Consumption and Stocks

at about 41,000 tons. Estimated imports in February fell 13,200 tons below the record for January. London stocks declined about 2,000 tons in February.

UNITED STATES CRUDE RUBBER IMPORTS, CONSUMPTION AND STOCKS

			Stocks			Singapore and Penang
1925	Imports Tons	Consumption Tons	On Hand† Tons	Afloat† Tons	London Tons	Tons†
Twelve months.	384,837	389,136	51,000*	48,000*	....	....
1926						
Twelve months.	411,900	358,415	72,510*	52,019*	....	....
1927						
Twelve months..	.....	439,034	369,747	47,939	63,207	25,868
1928						
January	46,200	34,403	110,114	41,256	66,285	25,868
February (est.).	33,000	33,000	110,000	41,000	....	....

*December 31.
†The first of each month.

New York Outside Market—Spot Closing Rubber Prices—Cents, Per Pound

	February, 1928					
PLANTATIONS	20	21	*22	23	24	25
Sheet						
Ribbed smoked	30⅞	28½	....	28⅝	28⅝	28⅝
Crepe						
First latex	31⅛	28⅜	....	28¼	28⅜	28⅜
No. 2 blanket	29⅜	27⅜	....	27	26⅜	27
No. 3 blanket	28⅜	27	....	26⅜	26⅛	26⅛
No. 4 blanket	28¼	26⅜	....	25½	25½	25½
Thin clean brown	28⅜	26½	....	26¼	26	26¼
Rolled brown	25¼	23⅜	....	22⅝	22¾	23
Off latex	30¾	28⅜	....	28½	28	28½

*Holiday.

New York Quotations

Following are the New York spot and future rubber quotations for one year ago, one month ago and Feb. 24 the current date:

Plantation Heves	February 24, 1927	January 26, 1928	February 24, 1928
Rubber latex (Hevea)..gal.	$1.50 @	$1.50 @	$1.50 @
CREPE			
First latex, spot	.39½ @.39¾	.40¼ @.40½	.28½ @
February	.39¾ @	.40½ @	.28½ @
February-March	.39¾ @	.40½ @	.28½ @.28¾
April-June	.40¼ @	.41¼ @	.28¾ @
July-September	.41 @	@	.29 @
Off latex, spot	.39 @	.40 @	.28 @
Amber No. 2, spot	.36½ @	.37¾ @.38	.25½ @
February	.36½ @	.38 @	.25½ @
February-March	.36½ @	.37¾ @	.25½ @.25¾
April-June	.38¼ @	.38¼ @	.25¾ @.26
July-September	.37 @	@	.26 @
Amber No. 3, spot	.36 @	.37½ @.37½	.25 @
Brown, thin, clean	.36 @	.37¼ @	.25 @
Brown specky	.35½ @	.37 @	.24½ @
Brown, roll	.32 @	.33¼ @.33½	.23¾ @
Sole crepe	.62 @	@	@
Sheet			
Ribbed, smoked spot	.39 @	.40 @.40½	.28¼ @
February	.39¼ @	.40½ @	.28¼ @
February-March	.39¼ @	.40½ @	.28¾ @.28½
April-June	.40 @	.41½ @	.28½ @
July-September	.41 @	.41¼ @	.28¾ @
East Indian			
PONTIANAK			
Banjermassin	.10½ @	.09 @.10	.10 @.10¼
Pressed block	.20 @	.15 @	.14⅞ @.15
Sarawak	@	.10 @	.10 @
South American			
PARAS			
Upriver, fine	.30 @	.30¼ @	.24 @
Upriver, fine	*.41 @	*.47¾ @	*.28½ @
Upriver, medium	.25 @	.28 @	.23 @
Upriver, coarse	.23 @	.26 @	.20½ @
Upriver, coarse	*.34½ @	*.37¾ @	@
Islands, fine	.27 @	.29 @	@
Islands, fine	*.39 @	*.40 @	*.34 @
Acre, Bolivian, fine	.31 @	.31½ @	.25 @
Acre, Bolivian, fine	*.42 @	@	*.34½ @
Beni, Bolivian	.31 @	.32¼ @	.26 @
Madeira, fine	.31 @	.31 @	.25 @
Peruvian, fine	.29 @	.30½ @	.24 @
Tapajos, fine	.27 @	.29¾ @	.23½ @
CAUCHO			
Upper Caucho ball	.25 @	.26½ @	.20½ @
Upper Caucho ball	*.35½ @	*.38 @	*.30 @
Lower Caucho ball	.23 @	.24¼ @	.19½ @
Maniçobas			
Ceará negro heads	.24 @	.25 @	†.18 @
Ceará scrap	.14 @	.16 @	†.10 @
Maniçoba, 30% guaranteed	.28 @	.30 @	†.20 @
Mangabiera, thin sheet	.28 @	.32 @	†.20 @
Centrals			
Central scrap	.23 @	.25 @	.18 @.18½
Central wet sheet	.16 @	.20 @	@
Corinto scrap	.22¼ @	.25 @	.18 @.18½
Esmeralda sausage	.23 @	.25 @	.18 @.18½
Guayule			
Duro, washed and dried	.31 @	.32 @	†.28½ @
Gutta Percha			
Gutta Siak	.25 @	.22 @	.20 @.20¼
Gutta Soh	.46 @	.38 @	.36 @
Gutta Macassar	3.00 @	2.80 @ 3.00	2.80 @ 3.00
Balata			
Block, Ciudad Bolivar	.39 @	.43½ @	.44 @.45
Colombia	.38 @	.43 @.44	.41 @.42
Manaos block	@	.46 @	.45 @.46
Panama	@	.42 @	.41 @
Surinam, sheet	.66 @	.56 @.57	.54 @
Amber	.73 @	.60 @.61	.57 @
Chicle			
Honduras	‡.56 @	‡.65 @	‡.65 @
Yucatan, fine	‡.56 @	‡.65 @	‡.65 @

*Washed and dried crepe. Shipment from Brazil.
†Nominal. ‡Duty paid.

Low and High New York Spot Prices

	February					
PLANTATIONS	1928*		1927		1926	
First latex crepe	$0.28½ @	$0.38¼	$0.37½ @	$0.40¾	$0.53 @	$0.69½
Smoked sheet, ribbed	.28½ @	.38	.37¼ @	.40	.51½ @	.68
PARAS						
Upriver, fine	.24¼ @	.29	.27¾ @	.32	.44½ @	.65
Upriver, coarse	.19 @	.24½	.20½ @	.25	.35 @	.50
Islands, fine	.....	.....	.25 @	.28¾	.40 @	.53

*Figured to February 25, 1928.

The Market for Rubber Scrap

Collections of rubber scrap have not been heavy. The market was active but weak in all grades.

AIR BRAKE HOSE. This continues to be in good demand and prices are unchanged.

BOOTS AND SHOES. These grades are quiet with quotations nominal and unchanged.

INNER TUBES. Scrap inner tubes of all grades are in good demand but weaker due to the drop in crude rubber prices. The export trade with Europe is very good.

MECHANICAL GOODS. The movement of these grades holds fair in tonnage. Black scrap is quiet with no changes in quotations.

TIRES. The demand for tires is good but weaker. Collections are in fair volume.

New York Quotations for Carload Lots

February 24, 1928

Boots and Shoes			
Boots and shoes, black	lb.	$0.01¼ @	$0.01⅞
Red and white	lb.	.01 @	.0115
Trimmed arctics, black	lb.	.00¾ @	.01
Untrimmed arctics	lb.	.00¾ @	.01
Tennis shoes and soles	lb.	.01 @	
Hard Rubber			
No. 1 hard rubber	lb.	.09½ @	.10
Battery jars, black compound	lb.	.01 @	.01½
Inner Tubes			
No. 1, floating	lb.	.07¾ @	.07⅞
No. 2, compounded	lb.	.05 @	.05⅛
Red	lb.	.06¼ @	.06½
Mixed tubes	lb.	.04⅞ @	.05
Mechanicals			
Mixed black scrap	lb.	.00¾ @	.01
Heels	lb.	.00½ @	.00⅝
Hose, air brake	ton	35.00 @	38.00
regular soft	ton	15.00 @	17.00
No. 1 red	lb.	.02 @	.02½
No. 2 red	lb.	.01 @	.01¼
White, druggists' sundries	lb.	.02½ @	.03
Mechanical	lb.	.01½ @	.01⅝
Tires			
Pneumatic Standard—			
Mixed auto tires with beads	ton	25.00 @	25.50
Beadless	ton	34.00 @	34.50
White auto tires with beads	ton	40.00 @	42.00
Beadless	ton	50.00 @	52.00
Mixed auto peelings	ton	35.00 @	36.00
Solid—			
Mixed motor truck, clean	ton	22.50 @	23.00

Ceylon Rubber Exports

January 1 to November 30, 1927

	Tons
To United Kingdom	14,331.32
Continent	2,961.07
Australia	1,515.98
America	32,164.17
Egypt	10.00
Africa	89.20
India	25.48
Japan	170.83
Total	51,268.05
For the same period last year	52,445.23

ANNUAL EXPORTS 1921-1926

	Tons
For the year 1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14
1921	40,210.31

EXCESSIVE SLIPPING OF RUBBER BELTS CAN BE PREVENTED AND pliability fairly restored, it is said, with a slight dressing of castor oil or even of raw linseed oil.

COMMON SHELLAC IN ALCOHOL MAKES A GOOD EMERGENCY patching cement for many soft rubber articles.

World's Rubber Position

By W. H. RICKINSON & SON

The high peak of the price curve in 1925 followed in 1926 by a continuous fall had during 1927 reached the "flattening out" stage, with periods of pessimism and optimism. The points of interest for the year have been: (1) Fluctuations in the price have been smaller than any during the past 21 years. (2) The over-assessment of estates and unused coupons produced at least 40,000 tons of rubber. (3) That the 80 per cent export in January and the 70 per cent in February, March and April produced about 20,000 tons that can only recur in 1928 with higher prices.

The beginning of 1928 shows a sound position for two main reasons. The first, that should consumption fall for any unforeseen reason there is not likely to be any material increase in stocks owing to the increasing stringency of the restriction scheme (see Notes Nos. 2 and 3 above); and secondly, should consumption show a fair increase there is sufficient world's stock in conjunction with the amended restriction scheme as regards releases to prevent a recurrence of the 1925 prices. There is a big speculative interest in rubber nowadays, and any doubt about the amount of "free" rubber in the stocks may lead to periods of sharp fluctuations. The absence of an authoritative statement as to whether the 100,000 tons of rubber in stock in the United States includes stock held outside the United States might easily give the speculation an opportunity before the end of the year.

1927

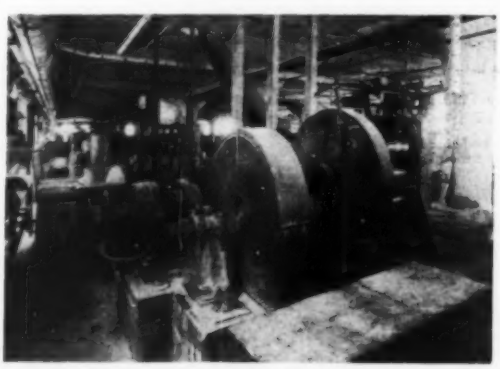
SHIPMENTS	Tons	P. C.	RETAINED	Tons	P. C.
†British Malaya, Ceylon, Dutch East Indies (Including Smuggled) under restriction	242,030	40.1	U. S. A.	397,278	63.8
	55,598	9.2	‡United Kingdom	60,248	9.7
	228,000	37.7	France	36,000	5.8
Other Plantations	41,000	6.8	Germany	40,000	6.4
Brazil	30,952	5.1	Italy	11,000	1.8
Wild (Africans, etc.)	6,740	1.1	Canada	26,000	4.2
	604,320		Japan	20,169	3.2
Balance	18,356		Russia	12,000	1.9
(Difference due to amount "afloat" at beginning and end of year, final official figures, etc.)			Rest	19,981	3.2
			Total	622,676	100.0
Total	622,676	100.0			

†Includes latex, etc. ‡Actual consumption and in manufacturers' hands, 44,659 tons.

ESTIMATE FOR 1928

AVAILABLE	Tons	P. C.	REQUIREMENTS	Tons	P. C.
British Malaya {60} / Ceylon {⅝}	189,000	29.6	U. S. A.	405,000	63.5
	45,000	7.0	United Kingdom	50,000	7.8
Unused Coupons	5,000	0.8	France	35,000	5.5
Dutch East Indies	240,000	37.6	Germany	40,000	6.3
Other Plantations	43,000	6.8	Italy	12,000	1.9
Brazil	32,000	5.0	Canada	28,000	4.4
Wild (Africans, etc.)	8,000	1.3	Japan	22,000	3.4
	562,000		Russia	14,000	2.2
Probable deficit to be met out of stocks	76,000	11.9	Rest	32,000	5.0
			Total	638,000	100.0
Total	638,000	100.0			

A BILL HAS BEEN INTRODUCED IN THE SENATE FOR THE construction of an international highway linking the United States with Central and South America. It is believed that the highway, which is sponsored by the American Motorists' Association and other organizations, would promote good will between the countries.



GENERAL ELECTRIC MOTOR DRIVING A 4-ROLL THROPP CALENDER IN THE PLANT OF THE COMBINATION RUBBER CO., TRENTON, N. J.

Compounding Ingredients Market

COMPANIES manufacturing tires and tubes are working on high production schedules not far if at all below their full capacity. In mechanical and other lines production is on a much more moderate scale. The movement of ingredients generally is in good volume.

ACCELERATORS. The demand for accelerators of both ordinary and extra rapid continues to steadily increase.

ANTI-OXIDANTS. Two new anti-oxidants are now offered for general use. They are designated as Oxynone and Age-Rite powder, and are made by different concerns.

BENZOL. The production of benzol is at about 50 per cent of normal. The supply is therefore not in excess of the demand.

CARBON BLACK. The price of standard rubber grade advanced ½ cent a pound to 7 cents. The price is firm and demand increasing.

CLAY. The demand for hard and soft clay is steady at heavy tonnages.

DEGRAS. This softener is steadily gaining favor with rubber workers for use in stocks charged with ingredients difficult to disperse.

LITHARGE. The market price is easy, demand steady and of hand to mouth character.

LITHOPONE. The price is steady and consumption of seasonal character.

MINERAL RUBBER. There is no change in the situation of this material either as to price or demand. Increasing tonnages are constantly passing into consumption.

SOLVENT NAPHTHA. There is considerable resistance to further reduction of prices. Consuming demand continues fair.

STEARIC ACID. Prices and demand are steady.

ZINC OXIDE. Encouraging indications are noted for increased demand for this material by the rubber industry during the current year.

New York Quotations

February 24, 1928

Accelerators, Inorganic

Lead, carbonate	lb.	$0.08½	@
Lead, red	lb.	.10	@
sublimed white	lb.	.07¾	@
sublimed blue	lb.	.07¾	@
super-sublimed white lead	lb.	.08¼	@
Lime, R. M. hydrated	ton		@
Litharge	lb.	.09	@
Magnesia cal., light	lb.		@
calcined, extra light	lb.		@
calcined, heavy	ton		@
magnesium, carb., light	lb.		@
Orange mineral A.A.A	lb.	.12	@

Accelerators, Organic

A-7	lb.	.65	@	.85
A-11	lb.	.70	@	.90
A-16	lb.	.65	@	.85
A-19	lb.	.70	@	.90
A-20	lb.	.64	@	.80
Aldehyde ammonia	lb.	.65	@	.70
B. B.	lb.		@	
Captax	lb.		@	
Crylene, hard form	lb.		@	
Paste	lb.		@	
Di-ortho-tolylguanidine	lb.	.80	@	.85
Diphenyl guanidine	lb.	.64	@	.68
Ethylidine aniline	lb.	.60	@	.65
Formaldehyde aniline	lb.	.36	@	.38
Grasselerator 102	lb.	.62½	@	.67½
552	lb.	4.45	@	
808	lb.	1.05	@	1.35
833	lb.	1.55	@	1.75
Heptene	lb.	.55	@	
Hexamethylene tetramine	lb.	.62½	@	.67½
Methylene dianiline	lb.	.37	@	
Monex	lb.		@	
No. 999 lead oleate	lb.	.15	@	
Oxynone	lb.	.68	@	.90
Piperidine pentamethylene dithio carbamate	lb.	4.45	@	4.60
Plastone	lb.	.36	@	
R. & H. 40	lb.	.50	@	.55
50	lb.	.50	@	.55
Resistox	lb.	.60	@	.70
Safex	lb.		@	
Super-sulphur, No. 1	lb.		@	
No. 2	lb.		@	
Tensilac No. 39	lb.	.55	@	.60
No. 41	lb.	.65	@	.70
Thermlo F	lb.	.50	@	.55
Thionex	lb.	3.25	@	
Thiocarbanilid	lb.	.23	@	.26½
Trimene	lb.		@	
base	lb.		@	
Triphenylguanidine	lb.	.65	@	.70
Tuads	lb.		@	
Vulcanex	lb.	.70	@	
Vulcanol	lb.	1.03	@	
Vulcone	lb.	.70	@	
ZBX	lb.	2.50	@	
Z-88	lb.	.75	@	1.00
Zimate	lb.		@	

Acids

Acetic 28% (bbls.)	100 lbs.	$3.37½	@	$3.62½
glacial (carboys)	100 lbs.	12.41	@	12.66
Sulphuric, 66°	100 lbs.	1.60	@	

Alkalies

Caustic soda, solid	lb	.29	@	

Anti-Oxidants

Age-Rite, powder	lb.		@	
resin	lb.		@	
Antox	lb.		@	
Neozone	lb.	.74	@	
Oxynone	lb.		@	
Stabilite	lb.	.65	@	
V. G. B	lb.		@	

Colors

BLACK

Bone	lb.	.06	@	.09
Carbon (see Comp. Ing.)				
A. & W. nonfli No. 1	lb.	.40	@	
Drop	lb.	.06	@	.10
Lampblack (commercial)	lb.	.09	@	

BLUE

A. & W. blue	lb.	1.25	@	5.00
Du Pont, N.	100 lbs.	1.35	@	
Marine, A. C.	100 lbs.	1.30	@	
5 R.	100 lbs.	1.00	@	
2 G.	100 lbs.	.90	@	
Huber Brilliant	lb.	4.20	@	
Prussian	lb.	.31	@	.35
Ultramarine	lb.	.10	@	.25

BROWN

Huber Mocha	lb.	1.60	@	
Sienna, Italian, raw	lb.	.05	@	.12½

GREEN

A. & W. green	lb.	1.25	@	3.00
Chrome, light	lb.	.27	@	.31
medium	lb.	.28	@	.31
dark	lb.	.30	@	.33
Du Pont, A. C.	100 lbs.	3.00	@	
4 G.	100 lbs.	.60	@	
G. L.	100 lbs.	.30	@	
Y. L.	100 lbs.	.75	@	
Huber Brilliant	lb.	3.85	@	
Oxide of chromium	lb.	.38	@	

ORANGE

Du Pont, 2 R	100 lbs.	1.40	@	
R. X.	100 lbs.	1.30	@	
Y. O.	100 lbs.	1.60	@	
Huber Persian	lb.	.50	@	

RED

A. & W. red	lb.	.75	@	3.50
purple	lb.	2.00	@	4.00
Antimony, golden, No. 40	lb.		@	
No. 60	lb.		@	
golden 15/17%	lb	.16	@	.20
Huber Brilliant	lb.	1.35	@	

Colors—(Continued)

Antimony

Crimson, R.M.P. No. 3	lb.	$0.50	@	
Sulphur free	lb.	.55	@	
7-A.	lb.	.35	@	
Z-2	lb.	.22	@	
Vermilion, No. 5	lb.		@	
No. 15	lb.		@	
Du Pont, R. I.	100 lbs.	1.75	@	
6 B.	100 lbs.	.90	@	
Brilliant A. C.	100 lbs.	.90	@	

Iron Oxides

bright pure domestic	lb.	.12	@	
bright pure English	lb.	.12	@	.14
bright reduced English	lb.	.09	@	.11
bright reduced domestic	lb.	.10	@	
Indian (maroon), pure domestic	lb.	.11	@	
Indian (maroon), pure English	lb.	.10½	@	.11
Indian (maroon), reduced English	lb.	.08	@	.09
Indian (maroon), reduced domestic	lb.	.08	@	
Oximony	lb.	.13½	@	
Spanish red oxide	lb.	.03	@	.04½
Venetian reds	lb.	.02	@	.06
Vermilion, Eng. quicksilver	lb.	1.90	@	1.95

WHITE

Lithopone	lb.	.05½	@	.05¾
Azolith	lb.	.05¼	@	.05¾
Grasselli	lb.		@	
Sterling	lb.		@	
Zinc Oxide				
AAA (lead free)	lb.	.06½	@	
Azo (factory):				
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06¾	@	.06¾
Z (8% leaded)	lb.	.06¾	@	.06¾
French Process				
Green seal	lb.	.10¾	@	
Red seal	lb.	.09¾	@	
White seal	lb.	.11¾	@	

YELLOW

A. & W. yellow	lb.	2.00	@	4.00
Cadmium sulphide	lb.	1.35	@	2.00
Chrome	lb.	.16	@	.17
Du Pont N.	100 lbs.	4.00	@	
R. R.	100 lbs.	1.55	@	
Grasselli cadmium	lb.		@	
Huber Canary	lb.	3.30	@	
Ochre, domestic	lb.	.01½	@	.02¼
Oxide, pure	lb.	.08	@	.09
Zinc imported	lb.	.23	@	

New York Quotations

February 24, 1928

Compounding Ingredients

Aluminum flake (sacks c.l.)	ton		@
(sacks l.c.l.)	ton		@
Ammonium carbonate powd.	lb.	$0.11½	@
lump	lb.	.11	@
Asbestine	ton	13.40	@14.50
Barium, carbonate	lb.	.03	@
Barytes, imported	ton	27.00	@34.00
dry ground, white	ton		@
dry ground, off color	ton		@
No. 1 Missouri, water ground and floated, St. Louis	ton	23.00	@
Basofor	lb.	.04½	@
Blanc fixe, dry	lb.	.04¼	@
pulp	ton	60.00	@
Carbon Black			
Aerfloted arrow	lb.	.08	@ .12
Compressed	lb.	.07½	@ .11½
Uncompressed	lb.	.07	@ .11
Micronex	lb.	.08	@ .12
Carrara filler	ton	25.00	@
Chalk, precipitated	lb.	.04¼	@ .04¾
Clay, Blue Ridge, dark	ton		@
Blue Ridge, light	ton		@
China	lb.	.01½	@
Dixie	ton		@
Langford	ton		@
Mineral flour (Florida)	ton		@
Perfection	ton		@
Suprex	ton		@
Cotton flock, black	lb.	.09¼	@ .12½
light-colored	lb.	.10½	@ .12½
white	lb.	.11½	@ .22
Glue, high grade	lb.	.23	@ .27
low grade	lb.	.20	@ .24
Infusorial earth	ton	25.00	@
Mica, amber (fact'y)	ton	65.00	@80.00
Pumice stone, powd.	lb.	.02½	@ .04
Rotten stone (bbls.)	lb.	.02½	@ .04½
Soap bark	lb.	.18	@ .19
Soapstone	ton	15.00	@22.00
Talc, domestic	ton	15.00	@25.00
French	ton	18.00	@22.00
Pyrax A	ton		@
B	ton		@
Thermatomic carbon	lb.		@
Titanox	lb.	.10	@ .10½
Velvetex	lb.	.04	@ .07

Compounding Ingredients—(Continued)

Whiting:			
Commercial	100 lbs.	$0.85	@$1.00
English, cliffstone	100 lbs.	1.50	@
Quaker	ton		@
Snow white	ton		@
Sussex	ton		@
Westminster Brand	100 lbs.		@
Witco (c.l.) (fact'y)	ton		@
Whiting, imp. chalk	100 lbs.	1.00	@
Paris White, Eng. Cliff	100 lbs.	1.50	@

Factice—See Rubber Substitutes

Mineral Rubber

Fluxrite (solid)	lb.		@
Genasco (fact'y)	ton	50.00	@52.00
Gilsonite (fact'y)	ton	37.14	@39.65
Granulated M. R.	ton		@
Hydrocarbon, hard	ton		@
Hydrocarbon, soft	ton		@
Ohmlac Kapak, M. R.	ton	40.00	@90.00
M-4	ton	125.00	@
Paradura (fact'y)	ton	62.50	@65.00
Pioneer, M. R., solid (fac.)	ton	42.00	@45.00
M. R. granulated	ton	52.00	@55.00
Robertson, M. R., solid (fact'y)	ton	34.00	@80.00
M. R. gran. (fact'y)	ton	38.00	@80.00

Oils

Mineral	gal.	.15	@
Spindle	gal.	.20	@
Kerosene	gal.	.21	@
Rapeseed	gal.	.84	@
Red oil, distilled	lb.	.09¼	@ .10¼
Rubber process	gal.	.16	@

Rubber Substitutes or Factice

Black	lb.	.08	@ .14
Brown	lb.	.08	@ .15
White	lb.	.09	@ .165

Softeners

Burgundy pitch	lb.		@
Corn oil	lb.	.11	@
Cotton oil	lb.	.09¼	@
Cycline oil	gal.	.28	@ .33
Degras	lb.	.04	@ .04¾
Fluxrite (fluid)	lb.	.05	@ .06
Palm oil (Lagos)	lb.	.09½	@
Palm oil (Niger)	lb.	.09	@
Palm oil (Witco)	lb.		@
Para-flux	gal.	.17	@

Softeners—(Continued)

Petrolatum, snow white	lb.	$0.09¼	@$0.09½
Pigmentar	gal.	.33	@ .38
Pine oil, steam distilled	gal.	.68	@ .70
Rosin K	bbl.	9.65	@
Rosin oil	gal.	.55	@ .65
Rubtack	lb.		@
Shellac, orange	lb.	.70	@
Stearex	lb.	.10	@ .14
Stearic acid, double press'd.	lb.	.11¼	@ .12½
Tackol	lb.	.09	@ .15
Tar (retort)	bbl.	12.50	@13.00

Solvents

Benzol (90%, 7.21 lbs. gal.)	gal.	.26	@ .28
Carbon bisulphide (99.9%, 10.81 lbs. gal.) (drums)	lb.	.05	@ .06
tetrachloride (99.7%, 13.28 lbs. gal.) (drums)	lb.	.07½	@ .08
Gasoline No. 303			
Tankcars	gal.	.14	@
Drums, c. l.	gal.	.25	@
Drums, l. c. l.	gal.	.27	@
Solvent naphtha	gal.	.40	@
Turpentine, spirits	gal.	.60½	@ .61½
steam distilled	gal.	.57	@ .58

Vulcanizing Ingredients

Sulphur			
Velvet flour (240 lb. bbls.)	100 lbs.	2.95	@ 3.50
(150 lb. bags)	100 lbs.	2.60	@ 3.15
Soft rubber (c.l.)	100 lbs.	2.40	@ 2.75
(l.c.l.)	100 lbs.		@
Superfine commercial flour			
(210 lb. bbls.)	100 lbs.	2.55	@ 3.10
(100 lb. bags)	100 lbs.	2.20	@ 2.80
Tire brand, superfine	100 lbs.	1.90	@ 2.25
Tube brand, velvet	100 lbs.	2.40	@ 2.75
Vandex	lb.		@
(See also Colors—Antimony)			

Waxes

Beeswax, white, com.	lb.	.55	@
carnauba	lb.	.33	@ .60
ceresine, white	lb.	.12	@
montan	lb.	.07½	@
ozokerite, black	lb.	.27	@
green	lb.	.28	@
Paraffin			
122/124 white crude scale	lb.	.03	@
124/126 white crude scale	lb.	.03¼	@
120/122 fully refined	lb.	.05¾	@
125/127 fully refined	lb.	.06	@

OXYGEN AS RUBBER'S FRIEND

Oxygen has for so long been regarded as one of the worst enemies of rubber that a statement that it is in one process at least an important ally of rubber may occasion surprise. In experiments conducted by British technologists, J. D. Fry and B. D. Porritt, it was found that the familiar decrease in solution viscosity during milling or mastication of rubber was clearly due to the chemical influence of atmospheric oxygen as well as to the developed heat. The presence of oxygen was found essential before any marked reduction in solution viscosity could be brought about by heating rubber within the limits of temperature likely to arise in technical practice; and by increasing even slightly the oxygen percentage greater fluidity was obtained. Low viscosity solutions, it was also noted, could be best obtained with cold rather than with preheated rolls.

CAUSES OF TIRE TREAD WEAR

Watching through clear plate glass with both the naked eye and the photographic camera, the Bureau of Standards is experimenting with a specially constructed apparatus to determine how and why the treads of automobile tires wear and the effect of axle-load and air pressures. The apparatus, devised to ascertain by intimate observations the varying configurations in tire treads for the information of the industry, includes a miniature car moved back and forth on a track by rack and pinion, with tire pressing against the glass plate at varying pressures and loads.

RECORD SAFETY YEAR FOR FISK

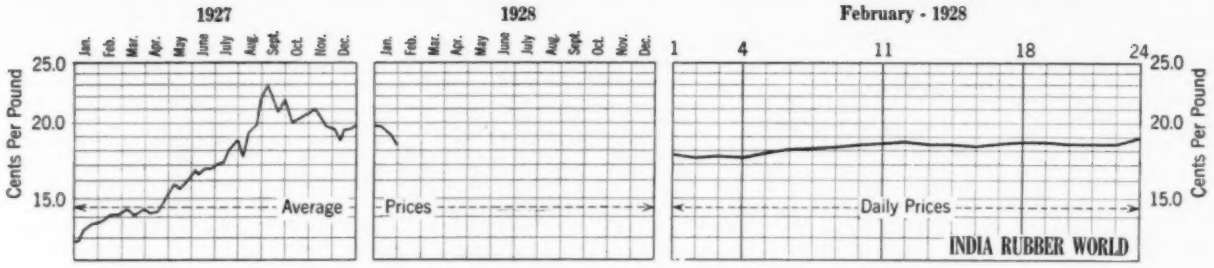
At the beginning of 1927 employes of The Fisk Rubber Co., Chicopee Falls, Mass., were asked to pull hard all year for the prevention of accidents. Most gratifying results have been noted and show what concerted effort may do to decrease the number of fatalities and injuries, as shown in the following table:

	1926	1927	Decrease Per cent
Minor accidents	8,170	5,185	37
Accidents causing loss of time from 1 to 7 days	27	14	48
Compensation cases (beyond 7 days)	58	21	64
Days lost as a result of accidents	11,746	860	93

With a reduction in total working hours of only 8 per cent, decreases have occurred from 37 to 93 per cent, and a difference of 10,986 days lost resulted in a saving of $50,000 in wages.

MEETING OF COTTON MANUFACTURERS ASSOCIATION

The regular spring meeting of The National Association of Cotton Manufacturers will be held in Providence, R. I., April 25-26. The program will include a session at the Old Slater Mill at which the centenary of the convention of the ring spindle by John Thorp will be celebrated.



Ratio Graph of New York Daily Prices of Spot Middling Upland Cotton

Market for Cotton and Fabrics

AMERICAN COTTON. The price for middling spot cotton on February 1 was 17.75 cents as compared with 19.55 cents on January 3. The steady decline that occurred during January reached its lowest level on February 2 at 17.45 cents. The following day a reaction began and the price advanced to 18.70 cents on the 13th. The remainder of that week the price level subsided 35 points but regained most of this drop before the close of the week.

The market may become disturbed should the proposed Congressional investigation of the New York and New Orleans cotton exchanges become effective.

EGYPTIAN COTTON. Egyptians, after weakening to a point where they became fairly attractive again advanced on trade buying abroad and expectations that crop estimates will fall below the figures given out in December. It is also suggested that the water situation may become critical during the coming summer both in Egypt and in the Sudan, but it is far too early to obtain any reliable estimates of this. It is also reported that an outbreak of fever in the Sudan may seriously curtail picking and ginning operations, but the authorities have announced that this outbreak is under control.

In America stocks of staples are not excessive and nothing definite will be known about the new crop for at least six months. It would seem that both price and basis will fluctuate entirely with the demand for goods as supplies are fairly well known.

ARIZONA PIMAS. Arizona Pimas are in very small supply and spinners who have not covered their requirements eight or nine month ahead will have to look to top grade Sudans for their extra fine staples.

Cotton Fabrics

SHEETINGS. The market was fairly active in February and prices ruled firm.

DUCKS, DRILLS AND OSNABURGS. The market lacks particular features at the present time. Cotton has advanced substantially $6 a bale over the price that ruled about the middle of February. Fabric prices have been firmer and the demand responded somewhat to the activity in the staple. Hose and belting ducks are active with no stocks accumulated as the mills are running only in accordance with orders in hand.

RAINCOAT FABRIC. The raincoat trade is very quiet at present. One rubberizer expressed the situation by saying he is doing the largest sample piece business in the history of the activities of his concern.

TIRE FABRICS. Probably most of the big buying for the first six months of 1928 has been done, although numerous filling in orders will come later if tire production is maintained at the rate now indicated. The fabric mills only need this extra business to be kept fairly busy. Little has been done in the way of commitments beyond July 1 although buyers will probably give thought to it within the next two months. Much depends upon the market level whether they will venture further commitments or not.

New York Quotations

February 24, 1928

Drills

38-inch	2.00-yard.....*yard*	$0.16¾@	
40-inch	3.47-yard.....	.10½@	
50-inch	1.52-yard.....	.22½@	
52-inch	1.90-yard.....	.17¾@	
52-inch	2.20-yard.....	.15½@	
59-inch	1.85-yard.....	.18½@	

Ducks

38-inch	2.00-yard S. F.*yard*	.16¼@	
40-inch	1.45-yard S. F.....	.22⅞@	
72-inch	1.05-yard D. F.....	.32 @	
72-inch	16.66-ounce.....	.36½@	
72-inch	17.21-ounce.....	.37½@	
MECHANICAL			
Hose and belting....*pound*		.34½@	.35
Specials		.39½@	
TENNIS			
52-inch	1.35-yard .....*yard*	.25¼@	

Hollands

RUBBER TRADE SPECIAL R. T. 3 A.			
31-inch	.....*yard*	.20 @	
40-inch	.....	.25 @	
50-inch	.....	.45 @	
RED SEAL			
36-inch	.....	.15½@	
40-inch	.....	.16½@	
50-inch	.....	.25 @	
GOLD SEAL			
40-inch, No. 72	.....	.20¾@	
40-inch, No. 80	.....	.22 @	

Osnaburgs

40-inch	2.35-yard .....*yard*	$0.14½@	
40-inch	2.48-yard	.13⅜@	
40-inch	3.00-yard	.11 @	
37-inch	2.42-yard	.13⅝@	

Raincoat Fabrics

COTTON			
Bombazine 64 x 60....*yard*		.11 @	
Bombazine 60 x 48.....		.10 @	
Plaids 60 x 48.....		.11¼@	
Plaids 48 x 48.....		.11¼@	
Surface prints 64 x 60.....		.13 @	
Surface prints 60 x 48.....		.12 @	
Print cloth 38½-in., 60 x 64.		.07⅝@	

Sheetings, 40-inch

48 x 48, 2.50 yard.....*yard*		.12¾@	.13
48 x 48, 2.85-yard.....		.11 @	.11¼
64 x 68, 3.15 yard.....		.12¾@	
56 x 60, 3.60-yard.....		.10 @	
44 x 48, 3.75-yard.....		.08½@	

Sheetings, 36-inch

48 x 48, 5.00 yard.....*yard*	.07 @	
40 x 44, 6.15-yard.....	.05¾@	

Tire Fabrics

SQUARE WOVEN 17¼-ounce		
Egyptian, karded.....*pound*		@
Peeler, karded.....	$0.46	@
BUILDER 23/11		
Peeler, karded.....*pound*	.46	@
BUILDER 10/5		
Peeler, karded.....*pound*	.42	@
CORD 23/5/3		
Egyptian, combed ....*pound*		@
Egyptian, karded		@
Peeler, karded, 1 1/16-in.....	.46	@
CORD 23/4/3		
Peeler, karded.....*pound*	.47	@
CORD 23/3/3		
Peeler, karded.....*pound*	.52	@
CORD 15/3/3		
Peeler, karded.....*pound*	.44	@
CORD 13/3/3		
Peeler, karded.....*pound*	.43	@
LENO BREAKER		
8-oz. Peeler, karded..*pound*	.46	@
10-oz. Peeler, karded.....	.46	@
CHAFER		
9.5-oz. Peeler, karded.*pound*	.53	@
12-oz. Peeler, karded.....	.50	@
14-oz. Peeler, karded.....	.48	@

United States Rubber Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	November, 1927		Eleven Months Ended November, 1927	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	86,445,231	$27,395,428	885,968,874	$317,661,200
Balata	313,154	109,252	1,175,233	436,105
Jelutong or Pontianak	1,757,959	231,055	16,673,223	2,388,310
Gutta percha	464,597	111,641	3,273,657	712,077
Guayule	1,110,200	258,137	10,407,378	2,479,877
Rubber scrap	1,939,472	64,082	19,184,236	816,127
Totals	92,030,613	$28,169,595	936,682,601	$324,493,696
Chicle *dutiable*	1,384,445	$698,151	10,576,483	$5,372,283
MANUFACTURED—*Dutiable*				
Rubber belting	49,960	$32,784	598,475	$365,764
Rubber tires	211	2,960	5,014	70,893
Other manufactures of rubber	.....	150,531	.....	1,282,671
Totals	50,171	$186,275	603,489	$1,719,328

EXPORTS OF FOREIGN MERCHANDISE

RUBBER MANUFACTURES				
Crude rubber	5,528,765	$2,014,196	56,270,218	$22,489,734
Balata	30,610	13,858	126,406	52,298
Gutta percha and rubber substitutes and scrap	100	68	99,665	14,706
Rubber manufactures	.....	83,785	.....	318,838
Totals	5,559,415	$2,111,907	56,496,289	$22,875,576

Exports of Domestic Merchandise

MANUFACTURED				
India Rubber				
Reclaimed	1,568,790	$124,469	17,493,905	$1,632,171
Scrap and old	3,695,364	267,822	27,826,518	1,726,419
Footwear				
Boots *pairs*	122,458	236,560	789,177	1,882,992
Shoes *pairs*	172,098	166,918	1,736,310	1,551,045
Canvas shoes with rubber soles *pairs*	336,584	220,037	4,438,134	3,026,948
Rubber water bottles and fountain syringes *number*	47,708	31,644	317,545	207,888
Rubber gloves *doz. pairs*	6,566	18,416	70,412	221,399
Other druggists' rubber sundries	.....	34,613	.....	412,013
Bathing caps *doz.*	3,253	7,887	153,409	328,234
Hard rubber goods				
Electrical hard rubber goods	136,771	39,971	1,121,764	278,239
Other hard rubber goods	.....	21,652	.....	346,398
Tires				
Casings, automobile *number*	171,523	2,316,403	2,427,027	31,315,531
Tubes, automobile *number*	115,874	276,589	1,497,399	3,229,457
Other casings and tubes *number*	4,088	9,002	53,908	154,448
Solid tires for automobiles and motor trucks *number*	4,777	181,115	92,979	2,746,716
Others	227,088	46,352	1,573,932	382,953
Tire accessories	.....	147,218	.....	1,689,321
Rubber and friction tape	143,548	40,325	1,392,628	399,123
Belting	365,019	200,483	4,469,754	2,382,999
Hose	519,888	190,596	6,494,273	2,439,761
Packing	166,901	81,061	2,230,041	1,020,182
Soles and heels	534,748	164,181	4,353,209	1,362,829
Thread	122,537	140,443	1,358,866	1,704,642
Rubber bands and erasers	71,872	47,195	812,382	582,727
Other rubber manufactures	.....	178,520	.....	2,175,359
Totals	.....	$5,189,472	.....	$63,199,794
Rubber toys and balls	.....	$12,272	.....	$162,256
Rubber balloons *gross*	57,741	$83,891	499,314	$678,194

Crude Rubber Imports by Customs Districts

	*December, 1927		Twelve Months Ended *December, 1927	
	Pounds	Value	Pounds	Value
Massachusetts	3,581,459	$1,054,811	44,883,411	$15,993,711
St. Lawrence	.....	.....	6,864	2,265
Buffalo	.....	.....	25,765	9,716
New York	60,551,725	19,693,625	847,551,552	301,425,798
Philadelphia	1,149,974	351,228	8,996,033	3,390,757
Maryland	1,420,624	428,602	23,462,822	8,294,434
New Orleans	.....	.....	2,057	227
Los Angeles	1,922,881	608,502	19,580,459	6,960,374
San Francisco	81,433	27,219	3,828,693	1,447,748
Oregon	89,885	29,248	873,069	329,817
Washington	.....	.....	112,000	44,240
Michigan	.....	.....	910	325
Chicago	.....	.....	500	128
Dakota	.....	.....	28	10
Ohio	50,400	20,339	4,518,692	1,616,663
Colorado	.....	.....	974,400	358,561
Totals	68,848,381	$22,213,574	954,817,255	$339,874,774

* Including latex, dry rubber content.

United Kingdom Rubber Statistics

IMPORTS

UNMANUFACTURED	December, 1927		Twelve Months Ended December, 1927	
Crude Rubber From—	Pounds	Value	Pounds	Value
Straits Settlements	9,005,000	£732,513	131,336,600	£10,150,239
Federated Malay States	4,586,800	372,444	64,363,300	4,943,881
British India	1,617,900	130,868	13,313,800	1,047,894
Ceylon and Dependencies	3,111,100	247,310	39,713,500	3,039,088
Other Dutch possessions in Indian Seas	1,972,100	159,884	26,455,200	2,036,697
Dutch East Indies (except other Dutch possessions in Indian Seas)	2,303,700	183,684	30,752,600	2,396,668
Other countries in East Indies and Pacific not elsewhere specified	236,100	17,887	3,117,700	233,385
Brazil	494,300	26,250	10,341,800	636,464
Peru	.....	.....	47,000	2,829
South and Central America (except Brazil and Peru)	8,700	601	192,300	13,680
West Africa:				
French West Africa	17,500	524	138,300	7,244
Gold Coast	50,900	3,866	611,000	41,972
Other parts of West Africa	224,400	14,121	1,978,200	138,362
East Africa, including Madagascar	152,100	12,257	1,654,600	123,716
Other countries	104,700	7,494	1,500,600	107,758
Totals	23,885,300	£1,909,703	325,516,500	£24,919,877
Waste and reclaimed rubber	773,600	12,325	7,436,000	114,182
Gutta percha and balata	398,800	38,053	4,874,700	442,594
Rubber substitutes	22,000	668	119,700	4,672
Totals	25,079,700	£1,960,749	337,946,900	£25,481,325
MANUFACTURED				
*†‡Tires and tubes				
Pneumatic				
Outer covers	.....	£63,906	.....	£2,633,693
Inner tubes	.....	9,916	.....	324,562
Solid tires	.....	9,229	.....	169,672
Boots and shoes *doz. pairs*	33,493	98,189	428,650	901,048
Other rubber manufactures	.....	141,317	.....	1,691,478
Totals	.....	£322,557	.....	£5,720,453

EXPORTS

UNMANUFACTURED				
Waste and reclaimed rubber	2,185,000	£25,039	27,091,100	£277,614
Rubber substitutes	57,500	1,461	659,400	15,662
Totals	2,242,500	£26,500	27,750,500	£293,276
MANUFACTURED				
‡*Tires and tubes				
Pneumatic				
Outer covers	.....	£150,996	.....	£2,812,982
Inner tubes	.....	24,463	.....	581,377
Solid tires	.....	23,625	.....	348,674
Boots and shoes *doz. pairs*	17,093	33,455	248,384	407,132
Other rubber manufactures	.....	211,877	.....	2,890,782
Totals	.....	£444,416	.....	£7,040,947

EXPORTS—COLONIAL AND FOREIGN

UNMANUFACTURED	December, 1927		Twelve Months Ended December, 1927	
Crude Rubber To—	Pounds	Value	Pounds	Value
Russia	2,137,800	£173,216	23,154,200	£2,085,403
Sweden, Norway and Denmark	137,600	12,942	2,401,700	221,703
Germany	2,271,000	176,657	31,507,700	2,492,718
Belgium	780,900	58,036	6,570,400	497,667
France	6,559,000	521,928	30,718,700	2,367,106
Spain	122,900	10,780	1,115,200	89,308
Italy	2,022,600	154,927	13,504,100	1,042,542
Other European countries	262,800	25,617	3,636,500	330,615
United States	8,851,200	653,054	77,010,200	5,865,202
Canada	1,600	203	49,000	4,294
Other countries	49,400	4,476	893,400	78,891
Totals	23,196,800	£1,791,836	190,561,100	£15,075,449
Waste and reclaimed rubber	12,000	540	316,600	8,876
Gutta percha and balata	77,800	6,506	670,300	61,839
Rubber substitutes	300	10	25,600	1,091
Totals	23,286,900	£1,798,892	191,573,600	£15,147,255
MANUFACTURED				
‡*Tires and tubes				
Pneumatic				
Outer covers	.....	£31,920	.....	£466,966
Inner tubes	.....	837	.....	61,748
Solid tires	.....	2,029	.....	11,727
Boots and shoes *doz. pairs*	788	2,184	12,922	28,961
Other rubber manufactures	.....	8,572	.....	108,097
Totals	.....	£45,542	.....	£677,499

* After April 12, 1927, tires and tubes imported or exported with complete vehicles or chassis, or fitted to wheels imported separately, are included under complete vehicles or parts.

† Motor cars, motorcycles, parts and accessories, liable to duty from September 29, 1915, until August 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts and accessories were exempt from duty until April 30, 1926, inclusive, and rubber tires and tubes until April 11, 1927, inclusive.

‡ Tires and tubes included prior to April 12, 1927.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

	Cases
JANUARY 15. By "Grootendyk," Europe.	
The Meyer & Brown Corp.	100
Raw Products Co.	133
JANUARY 15. By "Silver Fir," Far East.	
H. Muehlstein & Co., Inc.	272
JANUARY 16. By "Malayan Prince," Far East.	
H. A. Astlett & Co.	3,108
Baird Rubber & Trading Co., Inc.	615
General Rubber Co.	6,876
The Meyer & Brown Corp.	4,420
H. Muehlstein & Co., Inc.	145
Raw Products Co.	1,585
JANUARY 16. By "Pres. Taft," Far East.	
General Rubber Co.	250
JANUARY 17. By "Alaunia," Europe.	
General Rubber Co.	400
JANUARY 18. By "American Merchant," Europe.	
General Rubber Co.	1,461
JANUARY 18. By "Celtic," Far East.	
Baird Rubber & Trading Co., Inc.	65
The Meyer & Brown Corp.	8
JANUARY 19. By "Antilla," Mexico.	
Charles T. Wilson Co., Inc.	560
JANUARY 19. By "Mahronda," Far East.	
H. A. Astlett & Co.	164
Bierrie & Co., Inc.	100
General Rubber Co.	700
The Meyer & Brown Corp.	296
H. Muehlstein & Co., Inc.	35
Rogers Brown & Crocker Bros., Inc.	104
Charles T. Wilson Co., Inc.	177
JANUARY 19. By "Steel Navigator," Far East.	
H. A. Astlett & Co.	1,928
Baird Rubber & Trading Co., Inc.	100
General Rubber Co.	8,528
Haldane & Co., Inc.	120
Hood Rubber Co.	490
Littlejohn & Co., Inc.	5,594
The Meyer & Brown Corp.	4,266
H. Muehlstein & Co., Inc.	165
Poel & Kelly, Inc.	280
Raw Products Co.	537
Rogers Brown & Crocker Bros., Inc.	628
Charles T. Wilson Co., Inc.	150
JANUARY 20. By "City of Wellington," Far East.	
H. A. Astlett & Co.	1,272
Baird Rubber & Trading Co., Inc.	650
Bierrie & Co., Inc.	100
General Rubber Co.	2,570
Haldane & Co., Inc.	50
Hood Rubber Co.	152
Littlejohn & Co., Inc.	1,961
The Meyer & Brown Corp.	1,110
The Meyer & Brown Corp.	*268
H. Muehlstein & Co., Inc.	135
Poel & Kelly, Inc.	891
Raw Products Co.	100
Rogers Brown & Crocker Bros., Inc.	*140
Rogers Brown & Crocker Bros., Inc.	1,202
Charles T. Wilson Co., Inc.	258
JANUARY 20. By "Eastern Dawn," Far East.	
General Rubber Co.	165
Littlejohn & Co., Inc.	1,075
JANUARY 21. By "Matoppo," Far East.	
H. A. Astlett & Co.	150
Haldane & Co., Inc.	150
H. Muehlstein & Co., Inc.	5
Raw Products Co.	56
JANUARY 23. By "Kendal Castle," Far East.	
H. A. Astlett & Co.	2,953
Baird Rubber & Trading Co., Inc.	750
General Rubber Co.	9,106
Haldane & Co., Inc.	50
Hood Rubber Co.	1,150
Littlejohn & Co., Inc.	6,952
The Meyer & Brown Corp.	5,584
H. Muehlstein & Co., Inc.	145
Poel & Kelly, Inc.	730
Raw Products Co.	592
Rogers Brown & Crocker Bros., Inc.	1,579
Charles T. Wilson Co., Inc.	902
JANUARY 23. By "Naples Maru," Far East.	
General Rubber Co.	1,108
JANUARY 24. By "Albert Ballin," Far East.	
H. Muehlstein & Co., Inc.	10
JANUARY 25. By "Minnetonka," London.	
Baird Rubber & Trading Co., Inc.	813
General Rubber Co.	40
The Meyer & Brown Corp.	272
Charles T. Wilson Co., Inc.	255
JANUARY 25. By "Missouri," Europe.	
H. A. Astlett & Co.	96
Baird Rubber & Trading Co., Inc.	*201
Baird Rubber & Trading Co., Inc.	498
General Rubber Co.	161
Hood Rubber Co.	71
The Meyer & Brown Corp.	371
Poel & Kelly, Inc.	894
Charles T. Wilson Co., Inc.	150
JANUARY 25. By "Pres. Adams," Far East.	
H. A. Astlett & Co.	2,609
Baird Rubber & Trading Co., Inc.	1,940
Bierrie & Co., Inc.	224
General Rubber Co.	2,921
Haldane & Co., Inc.	106
Hood Rubber Co.	170
Littlejohn & Co., Inc.	2,411
The Meyer & Brown Corp.	3,192
The Meyer & Brown Corp.	*100
H. Muehlstein & Co., Inc.	210
Raw Products Co.	180
Rogers Brown & Crocker Bros., Inc.	*278
Rogers Brown & Crocker Bros., Inc.	1,292
Charles T. Wilson Co., Inc.	241
JANUARY 25. By "Rotterdam," Europe.	
Littlejohn & Co., Inc.	135
JANUARY 25. By "Samaria," London.	
Charles T. Wilson Co., Inc.	32
JANUARY 26. By "Albertic," Europe.	
General Rubber Co.	20
JANUARY 26. By "West Prospect," Far East.	
Littlejohn & Co., Inc.	†36
JANUARY 27. By "Eurypylus," Far East.	
H. A. Astlett & Co.	848
Bierrie & Co., Inc.	140
General Rubber Co.	3,818
Haldane & Co., Inc.	263
Hood Rubber Co.	*66
Littlejohn & Co., Inc.	2,354
The Meyer & Brown Corp.	1,407
H. Muehlstein & Co., Inc.	115
Poel & Kelly, Inc.	682
Raw Products Co.	329
Rogers Brown & Crocker Bros., Inc.	221
Charles T. Wilson Co., Inc.	917
JANUARY 28. By "City of Melbourne," Far East.	
H. A. Astlett & Co.	340
Bierrie & Co., Inc.	92
Haldane & Co., Inc.	100
Littlejohn & Co., Inc.	1,033
Poel & Kelly, Inc.	12
JANUARY 29. By "Pres. McKinley," Far East.	
H. A. Astlett & Co.	†70
JANUARY 30. By "Phemius," Far East.	
H. A. Astlett & Co.	2,694
Baird Rubber & Trading Co., Inc.	275
Bierrie & Co., Inc.	100
General Rubber Co.	4,531
Haldane & Co., Inc.	654
Hood Rubber Co.	*423
Littlejohn & Co., Inc.	5,784
The Meyer & Brown Corp.	2,694
The Meyer & Brown Corp.	*365
H. Muehlstein & Co., Inc.	35
Poel & Kelly, Inc.	640
Raw Products Co.	250
Rogers Brown & Crocker Bros., Inc.	1,833
Charles T. Wilson Co., Inc.	100
JANUARY 30. By "Pres. Jefferson," Far East.	
General Rubber Co.	250
JANUARY 31. By "Clydebank," Far East.	
Baird Rubber & Trading Co., Inc.	480
Bierrie & Co., Inc.	40
General Rubber Co.	1,561
Haldane & Co., Inc.	100
Littlejohn & Co., Inc.	1,282
The Meyer & Brown Corp.	982
H. Muehlstein & Co., Inc.	55
Poel & Kelly, Inc.	149
Rogers Brown & Crocker Bros., Inc.	104
Charles T. Wilson Co., Inc.	112
JANUARY 31. By "Pancras," Far East.	
General Rubber Co.	1,233
JANUARY 31. By "Ryndam," Europe.	
General Rubber Co.	102
JANUARY 31. By "Silver Hazel," Far East.	
H. A. Astlett & Co.	2,848
Baird Rubber & Trading Co., Inc.	830
General Rubber Co.	6,159
Haldane & Co., Inc.	646
Hood Rubber Co.	*346
Littlejohn & Co., Inc.	6,180
The Meyer & Brown Corp.	5,780
The Meyer & Brown Corp.	*275
H. Muehlstein & Co., Inc.	214
Poel & Kelly, Inc.	761
Raw Products Co.	282
Rogers Brown & Crocker Bros., Inc.	705
Charles T. Wilson Co., Inc.	2,579
FEBRUARY 1. By Ausonia," London.	
Baird Rubber & Trading Co., Inc.	111
H. Muehlstein & Co., Inc.	10
FEBRUARY 2. By "American Trader," Europe.	
Littlejohn & Co., Inc.	28
FEBRUARY 2. By "Andania," London.	
Poel & Kelly, Inc.	3,096
FEBRUARY 2. By "Minnekahda," London.	
Baird Rubber & Trading Co., Inc.	297
General Rubber Co.	379
The Meyer & Brown Corp.	146
Charles T. Wilson Co., Inc.	350
FEBRUARY 3. By "City of Birmingham," Far East.	
H. A. Astlett & Co.	380
Bierrie & Co., Inc.	50
General Rubber Co.	1,716
Littlejohn & Co., Inc.	656
The Meyer & Brown Corp.	100
The Meyer & Brown Corp.	*262
H. Muehlstein & Co., Inc.	450
Poel & Kelly, Inc.	100
Rogers Brown & Crocker Bros., Inc.	208
Charles T. Wilson Co., Inc.	677
FEBRUARY 6. By "Dakotian," London.	
Baird Rubber & Trading Co., Inc.	*68
FEBRUARY 6. By "Norwegian," London.	
Baird Rubber & Trading Co., Inc.	*323
Hood Rubber Co.	*96
Littlejohn & Co., Inc.	302
FEBRUARY 7. By "Djambi," Far East.	
H. A. Astlett & Co.	2,101
Baird Rubber & Trading Co., Inc.	183
Bierrie & Co., Inc.	394
General Rubber Co.	3,772
Haldane & Co., Inc.	412
Hood Rubber Co.	*50
Littlejohn & Co., Inc.	2,363
The Meyer & Brown Corp.	1,841
The Meyer & Brown Corp.	*660
H. Muehlstein & Co., Inc.	774
Poel & Kelly, Inc.	538
Raw Products Co.	410
Rogers Brown & Crocker Bros., Inc.	718
Charles T. Wilson Co., Inc.	565
FEBRUARY 7. By "Pres. Garfield," Far East.	
H. A. Astlett & Co.	2,241
Baird Rubber & Trading Co., Inc.	630
General Rubber Co.	1,538
Haldane & Co., Inc.	2,612
Hood Rubber Co.	*515
Littlejohn & Co., Inc.	2,680
The Meyer & Brown Corp.	702
The Meyer & Brown Corp.	*60
H. Muehlstein & Co., Inc.	443
Poel & Kelly, Inc.	275
Rogers Brown & Crocker Bros., Inc.	300
Charles T. Wilson Co., Inc.	724
FEBRUARY 8. By "Minnewaska," London.	
Baird Rubber & Trading Co., Inc.	666
The Meyer & Brown Corp.	848
FEBRUARY 9. By "Asiatic Prince," Far East.	
Baird Rubber & Trading Co., Inc.	450
Bierrie & Co., Inc.	153
General Rubber Co.	2,869
Haldane & Co., Inc.	50
Hood Rubber Co.	*132
Littlejohn & Co., Inc.	4,568
The Meyer & Brown Corp.	2,159
The Meyer & Brown Corp.	*521
H. Muehlstein & Co., Inc.	893
Poel & Kelly, Inc.	107
Raw Products Co.	467
Rogers Brown & Crocker Bros., Inc.	659
Charles T. Wilson Co., Inc.	550
FEBRUARY 9. By "City of Alton," Europe.	
General Rubber Co.	501
Littlejohn & Co., Inc.	559
FEBRUARY 9. By "Makalla," Far East.	
General Rubber Co.	1,470
The Meyer & Brown Corp.	280
H. Muehlstein & Co., Inc.	362
Charles T. Wilson Co., Inc.	168

*Arrived at Boston.
†Arrived at Los Angeles.

	Cases
February 10. By "Silver Ash," Far East.	
Baird Rubber & Trading Co., Inc.	1,148
General Rubber Co.	7,915
Haldane & Co., Inc.	250
Littlejohn & Co., Inc.	4,363
The Meyer & Brown Corp.	2,135
H. Muehlstein & Co., Inc.	996
Poel & Kelly, Inc.	656
Rogers Brown & Crocker Bros., Inc.	294
Charles T. Wilson Co., Inc.	665
February 12. By "Pres. Grant," Far East.	
Baird Rubber & Trading Co., Inc.	†250
February 13. By "Antonia," London.	
Baird Rubber & Trading Co., Inc.	841
Littlejohn & Co., Inc.	786
February 13. By "Caronia," London.	
Baird Rubber & Trading Co., Inc.	208
February 14. By "American Banker," London.	
Baird Rubber & Trading Co., Inc.	140
Littlejohn & Co., Inc.	548
February 14. By "Machaon," Far East.	
Baird Rubber & Trading Co., Inc.	810
Bierrie & Co., Inc.	168
Littlejohn & Co., Inc.	1,080
Charles T. Wilson Co., Inc.	250
February 15. By "Atlanta City," Far East.	
Baird Rubber & Trading Co., Inc.	179

	Cases
Bierrie & Co., Inc.	132
Littlejohn & Co., Inc.	1,980
H. Muehlstein & Co., Inc.	360
Charles T. Wilson Co., Inc.	484
February 15. By "Forresbank," Far East.	
Baird Rubber & Trading Co., Inc.	50
Hood Rubber Co.	*669
Littlejohn & Co., Inc.	4,281
The Meyer & Brown Corp.	*360
Charles T. Wilson Co., Inc.	100

Africans

January 16. By "Schodack," Europe.	
The Meyer & Brown Corp. pkgs.	572
January 21. By "Chicago," Europe.	
Littlejohn & Co., Inc.	566
The Meyer & Brown Corp. pkgs.	392
February 6. By "Collamer," Europe.	
Littlejohn & Co., Inc.	73
February 7. By "Deutschland," Europe.	
The Meyer & Brown Corp. pkgs.	205

Balata

February 1. By "Maraval," South America.	
Middleton & Co., Ltd. bales	3
February 6. By "Fort St. George," South America.	
Middleton & Co., Ltd. bales	50

Guayule

January 18. By "Antilla," Mexico.	
Continental Rubber Co. of New York	2,180
January 24. By "Canto," Mexico.	
Continental Rubber Co. of New York	1,760
February 1. By "Camaguey," Mexico.	
Continental Rubber Co. of New York	1,120
February 11. By "Yokohama," Mexico.	
Continental Rubber Co. of New York	2,680
February 15. By "Monterey," Mexico.	
Continental Rubber Co. of New York	2,740

Rubber Latex

	Gallons
January 23. By "Kendal Castle," Far East.	
General Rubber Co.	37,288
January 31. By "Silverhazel," Far East.	
General Rubber Co.	63,334
February 11. By "Silverash," Far East.	
General Rubber Co.	78,140

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
January 14. By "Francis," Brazil.					
H. A. Astlett & Co.	715	...	430	72	...
General Rubber Co.	1,345	76	190	72	*3
General Rubber Co.	...	...	...	...	**7
January 31. By "Pancras," Brazil.					
H. A. Astlett & Co.	285	...	242	147	...
Paul Bertuch & Co., Inc.	188	...	48	95	...
Littlejohn & Co., Inc.	1,049	78	210	174	...
The Meyer & Brown Corp. pkgs.	503	...	...	130	...
February 14. By "Swinburne," Brazil.					
General Rubber Co.	834	67	235	67	*2
Littlejohn & Co., Inc.	1,067	34	211	51	...
The Meyer & Brown Corp. pkgs.	63	...	422	...	...

* Mixed. ** Knapsack.

Plantation Rubber Exports from Malaya*

	January 1 to December 31, 1927		
	From Singapore Tons	From Penang Tons	From Malacca Tons
To United Kingdom	8,852.80	11,201.75	8,294.18
British Possessions	4,699.86	146.36	236.87
Continent of Europe	15,091.11	2,066.84	3,177.06
United States	157,830.90	29,785.45	10,639.57
Japan	13,736.14	2,287.00	2,606.70
Other Countries	96.11	.04	...
Totals	200,306.92	45,487.44	24,954.38

*Excluding all foreign transhipment.

British Malaya

RUBBER EXPORTS

An official cablegram from Singapore to the Malay States Information Agency, Malaya House, 57, Charing Cross London, S. W. 1., England, states that the amount of rubber exported from British Malaya in January last totaled 27,731 tons, as compared with 34,946 tons in the corresponding period of 1927. The amount of rubber imported was 16,618 tons, of which 13,023 tons were declared as wet rubber.

DISTRIBUTION

The following is a comparative return of distribution of shipments during the months of December, 1927, and January, 1928:

	December, 1927 Tons	January, 1928 Tons
United Kingdom	4,484	3,588
United States	24,112	21,331
Continent of Europe	1,198	1,412
British Possessions	775	284
Japan	1,605	1,109
Other foreign countries	11	7
Totals	32,185	27,731

London Stocks, December, 1927

	Landed Tons for Dec.	Delivered Tons for Dec.	Stocked December 31 Tons 1927	Tons 1926	Tons 1925
London					
Plantation	7,089	10,316	63,635	48,741	5,583
Other grades	5	36	105	100	36
Liverpool					
Plantation	†406	†784	†2,468	†1,897	†403
Total tons, London and Liverpool	7,500	11,136	66,208	50,738	6,022

†Official returns from the six recognized public warehouses.

TIRE INVENTORY — PRODUCTION — DOMESTIC SHIPMENTS

Pneumatic casings, all types, declined in production and shipments during December, but show an increase in inventory. Inner tubes for the same period show an increase in inventory and production with a falling off in shipments. Inventory, production and shipment for both pneumatic casings and inner tubes were higher during the month of December, 1926, than for the corresponding month in 1927.

Solid and cushion tires rose in inventory and production but fell in shipments during the month. All figures are below those for December, 1926.

Cotton and crude rubber consumption also was less during December than in November.

	December, 1927 Inventory*	Production	Shipments
Pneumatic casings—all types	7,697,691	3,373,080	3,123,541
Inner tubes—all types	10,268,996	3,726,799	3,534,052
Balloon casings	3,844,039	1,824,668	1,710,893
Balloon inner tubes	4,523,047	1,617,875	1,734,026
High pressure cord casings	3,649,536	1,487,624	1,368,158
High pressure inner tubes	5,745,949	2,108,924	1,800,026
Solid and cushion tires	158,562	32,241	31,793

Cotton and Crude Rubber Consumption, December, 1927

	Pounds
Cotton fabric	11,949,002
Crude rubber	32,653,772

* As of December 31, 1927.
Rubber Association figures representing 75 per cent of the industry.

SWITZERLAND'S RUBBER TRADE

A small rubber industry exists in Switzerland which imported 293 metric tons of crude rubber in 1924; 470 tons in 1925; and 415 tons in 1926. These figures include besides crude rubber, patent sheets with or without sulphur and other material, not vulcanized, and rubber and gutta percha waste.

STATISTICS COMPILED BY THE NATIONAL AUTOMOBILE CHAMBER of Commerce show that 3,530,080 cars and trucks were manufactured in 1927, the wholesale value of which was $2,556,750,000.